

**UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION**

AMY HUANG, on behalf of herself and all those similarly situated,

Plaintiff,

vs.

CHICAGO BOARD OPTIONS EXCHANGE,
INC., CBOE FUTURES EXCHANGE, LLC, and
JOHN DOES 1-50,

Defendants.

Case No. _____

Jury Trial Demanded

CLASS ACTION COMPLAINT

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Plaintiff Amy Huang brings this class action against Defendants Chicago Board Options Exchange, Inc., CBOE Futures Exchange, LLC, and John Does 1-50, for claims under the Commodity Exchange Act (“CEA”) to recover actual and punitive damages for the substantial injuries she and others similarly situated have sustained arising from the manipulation of the Chicago Board Options Exchange’s Volatility Index® (“VIX”) and related VIX derivatives, including VIX futures and options. Plaintiff’s allegations are based on personal knowledge as to Plaintiff and Plaintiff’s own actions and upon information and belief as to all other matters.

NATURE OF THE ACTION

1. Manipulation in financial markets is nothing new; regulatory investigations in recent years have revealed that key benchmark rates such as LIBOR, ISDAFIX, and the WMR and ECB FX rates were manipulated to artificial levels, as were the prices of commodities and related derivative products such as gold and silver. Indeed, regulators are currently investigating whether the very foundation of the U.S. monetary system—U.S. Treasuries—have also been subjected to manipulation.

2. This action concerns yet another important benchmark in the financial markets: the VIX, a widely-tracked financial index that measures the 30-day implied volatility of the stock (equity) market. The VIX is commonly referred to as Wall Street’s “fear gauge” because it typically rises and falls on investors’ concerns about stock market drops.

3. Originally introduced in 1993, the VIX was intended to serve as a benchmark of expected short-term market volatility and to provide an index upon which futures and options contracts on volatility could be written.

4. The VIX is calculated using a formula linked to S&P 500 index option prices. The index is similar to the Dow Jones Industrial Average, whereby the index is computed on a real-time basis on each trading day. But unlike the Dow Jones, VIX measures volatility, not pricing.

5. And while the VIX does not measure pricing nor is it a security itself, other financial products, such as VIX futures contracts and options, are directly linked to the index. Thousands of investors rely on the VIX in purchasing or selling these products every week.

6. Leading financial experts have long recognized the benefits of trading in volatility, which helps to explain the popularity of the VIX and its impact on the larger financial market. The Chicago Board Options Exchange originally launched trading of VIX futures contracts in May 2004 and VIX option contracts in February 2006, and since then, volatility trading—and the instruments relying on such trading—have increased dramatically. Indeed, the total daily trading volume of VIX futures and options is over 1,000,000 contracts per day.

7. The Chicago Board Options Exchange (“CBOE”) and its futures division, the CBOE Futures Exchange (“CFE”) (the CFE and CBOE are collectively referred to as the “CBOE Defendants”), regulate the trading of financial products linked to the VIX—namely futures and options. The CBOE Defendants’ Office of Enforcement conducts investigations into potential manipulation or related misconduct.¹ This oversight was intended to protect the VIX from unlawful manipulation. However, the CBOE Defendants were woefully derelict in their responsibilities, resulting in rampant, long-term manipulation of the VIX.

8. A recent empirical study (the “Griffin Study”) verified this. It concluded that trading data and pricing information “aligns itself” with market manipulation of the VIX.² The Griffin Study further found that “not only is it feasible to influence the VIX settlement, but also .

¹ Unless otherwise specified in this Complaint, references to “CBOE” refer to both the options exchange and the futures exchange.

² John M. Griffin & Amin Shams, *Manipulation in the VIX?* at 37 (May 23, 2017) (the “Griffin Study”), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2972979.

. . price and volume patterns at settlement [are] consistent with what one would expect from such strategic trading.”³

9. In the months following the release of the Griffin Study, the Financial Industry Regulatory Authority (“FINRA”) launched an investigation into this very same conduct. According to reports, the Securities and Exchange Commission (“SEC”) and Commodity Futures Trading Commission (“CFTC”) have also begun an investigation into the VIX for signs of potential manipulation.

10. In addition, a confidential whistleblower with high-level executive experience in the industry alerted the SEC and CFTC to manipulation in the VIX market. The whistleblower, relying on decades of experience at large trading firms, stated that there is a “*market manipulation scheme that takes advantage of a pervasive flaw*” in the VIX, allowing “trading firms with sophisticated algorithms to move the VIX up or down by simply posting quotes on S&P options and without needing to physically engage in any trading or deploying any capital.”⁴

11. Since the whistleblower’s announcement, other industry experts have confirmed the plausibility of these allegations. For example, Bart Chilton, a former commissioner of the CFTC, stated that allegations of VIX manipulation “ring[] true.” Many traders also believe that the sharp drop in the stock market on February 5, 2018, was fueled by irregularities in the VIX.⁵

12. John Doe Defendants have been manipulating the market for financial products priced off the VIX by raising and lowering the VIX to artificial levels using algorithmic trading and illicit trading practices, including uneconomical trading and spoofing. The effects of John

³ Griffin Study at 36.

⁴ Ltr. from Jason Zuckerman to James McDonald, et al., at 2 (Feb. 12, 2018) (emphasis added).

⁵ On February 5, 2018, the Dow Jones Industrial Average plunged by 1,175, the largest point decline in its history.

Doe Defendants' conduct have been disastrous. Per the Griffin Study, between January 2008 and April 2015, the price distortions to VIX futures and options cost investors \$1.81 billion.⁶

13. John Doe Defendants' market manipulation violates various provisions of the CEA and has caused significant damage to Plaintiff, Class Members, and the overall financial market.

14. Additionally, the CBOE Defendants knew or should have known that their own bylaws and/or rules—which expressly prohibited market manipulation and related unlawful conduct—were being violated by John Doe Defendants, but repeatedly refused to enforce those same bylaws and/or rules. The CBOE Defendants instead deliberately turned a blind eye to the ongoing market manipulation, allowing the conduct to continue. They ignored all warnings that the VIX was being manipulated, thus making them complicit in the unlawful activities. As a result of their bad faith conduct, Plaintiff and Class Members were damaged, and the CBOE Defendants should be held liable under the CEA.

15. Plaintiff brings this action on behalf of herself and all other similarly situated parties in an effort to end the illegal conduct and to recover damages caused by that conduct.

THE PARTIES

A. The Plaintiff

16. Plaintiff Amy Huang is a resident of New York. Ms. Huang transacted in VIX derivatives whose value is directly tied to the movement of the VIX. Defendants' manipulation of the VIX caused artificial prices in the VIX derivatives Ms. Huang transacted in and held. As a

⁶ Griffin Study at 30.

result, Defendants' manipulation proximately caused Ms. Huang to suffer losses on her position in various VIX derivatives.

B. The Defendants

17. CBOE Futures Exchange, LLC ("CFE") is a Delaware limited liability company with its principal place of business in Chicago, Illinois.

18. Chicago Board Options Exchange, Inc. ("CBOE") is a Delaware corporation with its principal place of business in Chicago, Illinois.

19. Together, the CFE and CBOE are referred to as the "**CBOE Defendants.**" The CBOE Defendants are responsible for administering and calculating the VIX, as well as supervising the trading of VIX-related derivatives, including VIX futures and options.

20. John Does 1-50 are entities or persons, including traders and trading firms, whose identities are currently unknown to Plaintiff because publicly available trading data for VIX products do not identify bidding or transacting parties. However, Defendants' identifications can be ascertained through electronic records maintained by the CBOE Defendants. During the Class Period (as defined below), the John Doe Defendants participated in and furthered the manipulation of the VIX and VIX futures and options.

21. All of Defendants' actions described in this Complaint are part of, and in furtherance of, the unlawful conduct alleged below, and were authorized, ordered, or done by Defendants' various officers, agents, employees, or other representatives while actively engaged in the management of Defendants' affairs (or that of their predecessors-in-interest) within the course and scope of their duties and employment, or with the actual, apparent, or ostensible authority of Defendants.

JURISDICTION AND VENUE

22. This Court has subject matter jurisdiction under 28 U.S.C. § 1331 because this action arises from violations of the Commodity Exchange Act, 7 U.S.C. § 1, *et seq.* This Court also has jurisdiction over this matter under 7 U.S.C. § 25(c), which provides subject matter jurisdiction of claims brought under 7 U.S.C. § 25(a).

23. This Court has personal jurisdiction over the CBOE Defendants because they are headquartered in this District. The Court also has personal jurisdiction over all Defendants by operation of the CEA, 7 U.S.C. § 25(c), because all Defendants are either found, reside, or transact business in this District or because the conduct giving rise to the CEA violations alleged below occurred in this District.

24. Venue is proper in this District under 28 U.S.C. § 1391(b), (c) and (d) because, during the Class Period, Defendants resided, transacted business, were found, or had agents within this District, and a portion of the affected interstate trade and commerce discussed below was carried out in this District.

25. Venue is also proper under 7 U.S.C. § 25(c) because the predicate acts of Defendants' manipulation took place in this District. Further, VIX derivatives that were affected by Defendants' manipulation are traded on electronic platforms controlled by the CBOE Defendants, who are located in this District.

FACTUAL BACKGROUND

A. General Background on the VIX

26. The VIX plays a significant role in the pricing of dozens of financial products traded on a daily basis. Even small variations in the VIX can, in the aggregate, substantially affect millions of dollars in transactions on a given day.

27. Introduced in 1993, the VIX was created to measure prospective volatility in the stock market, allowing traders to actually take positions in volatility without creating a new formula for each transaction.

28. The CBOE is responsible for calculating and disseminating the VIX.

29. The VIX is an “up-to-the-minute” market estimate of volatility that is calculated by using real-time prices of options on the S&P 500 Index (SPX) listed on the CBOE. The VIX is calculated using SPX quotes generated during regular trading hours for SPX options. The VIX uses SPX options with more than 23 days and less than 37 days to expiration and then weights them to yield a constant, 30-day measure of the expected volatility of the S&P 500 Index. SPX options are traded at various strike prices and maturities.

30. So, for example, if investors are purchasing more put options on the S&P 500 index, the pricing of those options rises, signaling increased volatility in the market. And the VIX then increases as a result to reflect market fears. This explains why Wall Street dubs the VIX the “fear gauge” or “fear index.”

31. Significantly, the VIX is used as a direct input on several derivatives contracts, including VIX futures and options. VIX futures and options contracts are among the most

heavily traded VIX derivatives, with over 1 million contracts traded daily. Figures 1 and 2 below demonstrate the average daily volume of VIX futures and VIX options traded on the CBOE.

Figure 1: VIX Futures Average Daily Volume (ADV)

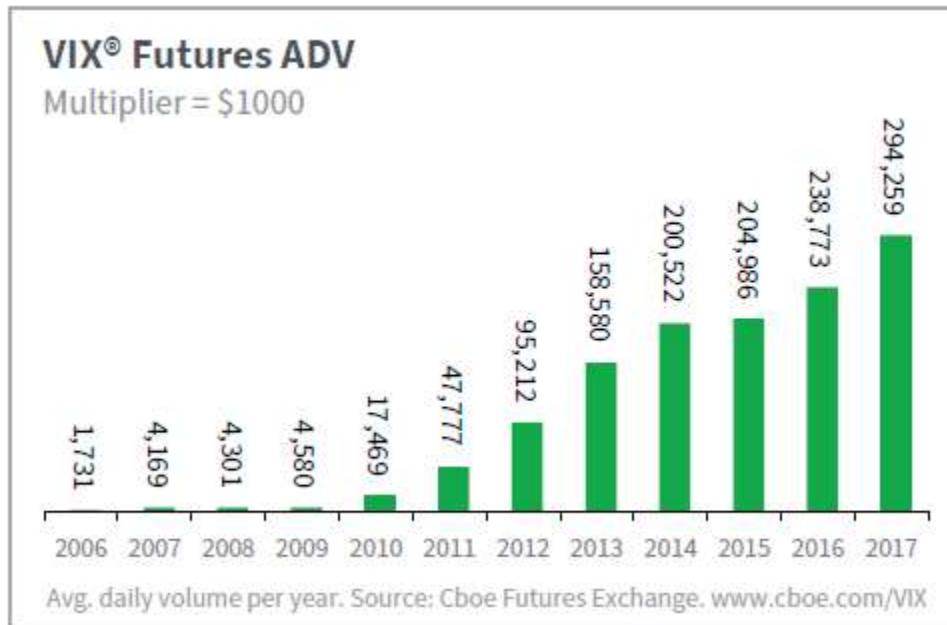
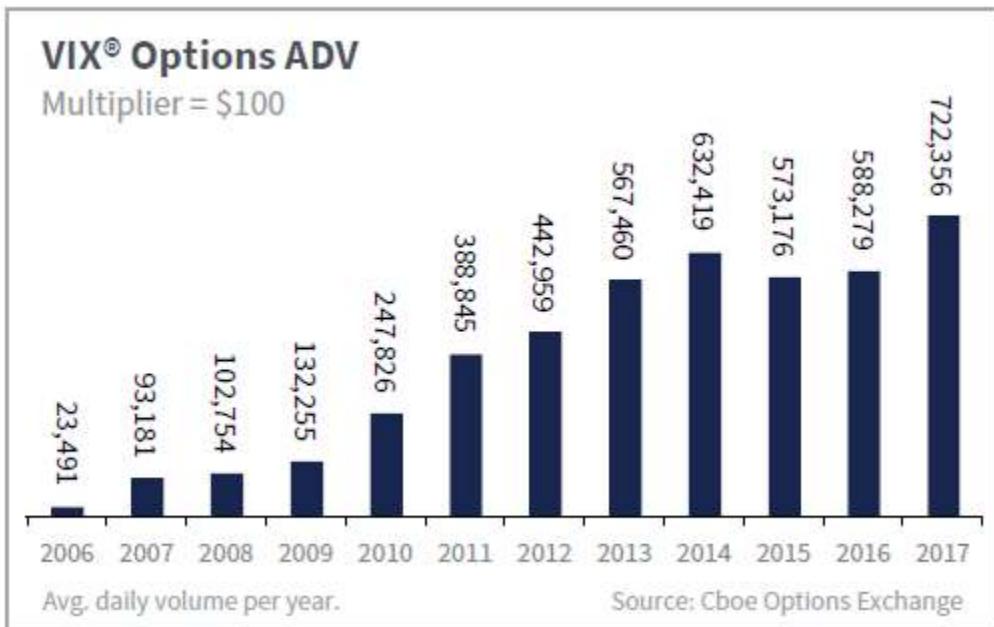


Figure 2: VIX Options Average Daily Volume (ADV)

B. VIX Futures and Options

32. The prices of VIX futures and options financial contracts rely directly on the VIX as an accurate measurement of market volatility.

33. **VIX Futures.** VIX futures contracts are traded electronically on the CFE through its “Command Platform.” Through this Platform, market participants can view the aggregated book of visible limit orders and prices for futures contracts, as well as enter their own orders and use pre-defined sets of trade matching rules to execute buy orders opposite sell orders for specific quantities at specified prices.

34. When a buy or sell order for a VIX futures contract is submitted to the Command Platform, it becomes part of the platform’s order book. The platform’s order book then matches buy and sell orders on a first in, first out basis, meaning that orders at the best available bid or

offer price are executed first. The best bid is the highest price at which a person is seeking to buy, and the best offer is the lowest price at which a person is seeking to sell.

35. There are generally two different order types for VIX futures (as well as other contracts): aggressive orders and passive orders.

36. Aggressive orders (also known as “market orders”) are orders that cross the bid-offer spread at the time of entry. This means in the case of a buy order, the order is priced at or above the best available offer price. Conversely, for a sell order, the order is priced at or below the best available bid price. Aggressive orders will be immediately executed.

37. Passive orders, by contrast, are those that are at the same or worse price than either the lowest sell order or the highest buy order at the time of entry. These orders “rest” in the Command Platform order book and will only be executed if an aggressive order matches the passive order.

38. VIX futures contracts settle either weekly or monthly. The CBOE may list VIX futures contracts up to six near-term expiration weeks, nine near-term serial months and five months on the February quarterly cycle.

39. Weekly VIX futures are denoted with ticker symbol “VX” followed by a number denoting the specific week of the calendar year it is settling (*e.g.*, VX01-VX53). Weekly VIX futures settle each Wednesday. Thus, for example, in 2016, the VX15 contract represented a VIX futures contract settling on Wednesday, April 13, 2016 (the 15th Wednesday of the year). The final settlement values of weekly VIX futures are calculated using P.M.-settling SPX options.

40. Monthly VIX futures contracts are denoted with the ticker symbol “VX.” Monthly VIX futures settle on the third Wednesday of each month in a calendar year. The final settlement values of monthly VIX futures are calculated using A.M.-settling SPX options.

41. Regular trading hours for VIX futures are between 8:30 a.m. to 3:15 p.m., but extended trading hours provide for nearly 24 hours of continuous VIX futures trading. However, during the extended trading hours, only stop limit orders—*i.e.*, buy or sell orders that are triggered when futures prices reach a certain, pre-set threshold—are permitted.

42. Trading hours for expiring VIX futures end at 8:00 a.m. Central Time on the final settlement date.

43. **VIX Options.** CBOE VIX options are similarly traded on the CBOE. VIX options come in two main varieties: “calls” and “puts.” A call option gives the holder of the call option the right, but not the obligation, to purchase the underlying asset at a negotiated price, known as the “strike,” at some future date when the option “expires.” One may either (a) buy a call option, paying a negotiated price or premium to the seller, writer, or grantor of the call, or (b) sell, write, or grant a call, thereby receiving that premium. If the underlying asset price exceeds the strike price, the call option is said to be “in-the-money” (“ITM”). If, at expiry, the underlying asset’s value is less than the strike, the call is said to be “out-of-the-money” (“OTM”).

44. Conversely, a put option gives the holder of the put the right, but not the obligation, to sell the underlying asset at the predetermined strike at the contract’s expiration. Similarly, one may buy or sell a put option, either paying or receiving a negotiated premium or price. When the underlying price is lower than the strike, the put option is ITM. If, at expiry, the underlying asset’s value is more than the strike, the put is OTM.

45. VIX options have a European exercise style, meaning that they can only be exercised at the option contract's expiry.

46. As with VIX futures, VIX options have both weekly and monthly settlements. The CBOE lists up to six consecutive weekly and contract months for trading. The last day that any VIX option, weekly or monthly, can be traded is the Tuesday prior to the expiration date (usually a Wednesday) of each contract week or month.

47. ***Settlement Procedures for VIX Futures and Options.*** The procedures for calculating the final settlement value for monthly VIX futures and options are similar. For both contracts, the final settlement value is determined using the auction-clearing prices of SPX options—*i.e.*, the instruments used to determine the VIX itself—in an auction called the Special Opening Quotation (“SOQ”).

48. To be included in the SOQ, SPX option orders can be submitted and canceled by market participants and market makers prior to the market open. Starting at 7:30 a.m. Central Time, SPX option orders can be submitted. Market participants are able to view the best bid and ask and indicative prices for each option. Between 8:15 a.m. and 8:30 a.m., *strategy* orders—*i.e.*, SPX option orders that are related to positions in VIX derivatives, such as VIX futures and options—can no longer be submitted.⁷ Only SPX option orders that are unrelated to VIX derivative positions may be submitted during that window. At 8:30 a.m. Central Time, the CBOE executes SPX option orders at the market-clearing prices (*i.e.*, the best bid and ask) and removes all remaining unexecuted orders.

⁷ The CBOE, in a recent notice to the market, changed the strategy order cut-off time to 8:15-8:20 a.m., effective as of February 8, 2017. See CBOE Regulatory Circular RG17-019 (Feb. 6, 2017).

49. The auction-clearing price for SPX options is used in the VIX formula to calculate the VIX settlement value. Significantly, only OTM SPX options are included the settlement calculation; ITM options are not included.

50. However, to prevent unnecessary skewing of the VIX from bids placed on far OTM SPX options, once there are two consecutive no-bids on OTM option strikes, the VIX settlement procedure excludes any further OTM options from the VIX calculation. Figure 3 below illustrates this procedure. As Figure 3 demonstrates, all bids on OTM SPX put options after the two zero-bids at 1360 and 1365 are excluded from the VIX calculation, while all bids at strikes greater than 1365 are included in the calculation. (The two zero bids are also excluded from the calculation.)

Figure 3: Illustration of Bids Included in VIX Calculation

Put Strike	Bid	Ask	Include?
1345	0	0.15	<i>Not considered following two zero bids</i>
1350	0.05	0.15	
1355	0.05	0.35	
1360	0	0.35	No
1365	0	0.35	No
1370	0.05	0.35	Yes
1375	0.1	0.15	Yes
1380	0.1	0.2	Yes

51. Upon determining the VIX, the VIX futures and options are settled to cash, with delivery of the cash settlement amount occurring the business day immediately following the final settlement date.

52. ***The VIX directly affects the value of VIX futures and VIX options.*** The tight correlation between prices in the cash and futures and options markets is well-known. If prices in the cash and derivatives markets diverge, arbitrageurs will bring those prices closer by buying the underlying asset and the selling the derivative (or vice versa) and making risk-free profits.

53. Although arbitrage opportunities between the VIX and VIX derivatives are more complicated than other commodity derivatives like wheat or corn futures because one cannot readily purchase or sell the VIX, there is nonetheless a tight correlation between the value of the VIX and the prices of VIX futures and options.

54. Both derivatives directionally track the value of the VIX, and indeed, converge with the VIX at the time of final settlement. As shown by formula below, the price of VIX futures is directly related to (1) the value of the VIX, and (2) the number of days (“X”) until the futures contract expires:

$$\text{VIX Future Price} = \text{VIX} + \left(1 - \frac{\text{VIX}}{\text{VIX median}}\right) * \ln(X + 1) + \sqrt{X} * 0.21$$

55. With the introduction of VIX weekly futures contracts in July 2015 and VIX weekly options in October 2015, VIX futures and options contracts now more closely track the VIX at all points.

56. The prices and values VIX futures and options are also tightly correlated because there is active arbitrage between these two derivative products.

57. As a result, any movements in the value of the VIX—whether caused by genuine market forces or manipulation—will have an immediate and direct effect on the prices and settlement values for VIX futures and options. Similarly, any movement in VIX futures—

whether caused by genuine market forces or manipulation—will have an immediate and direct effect on the prices of the VIX options and vice versa.

DEFENDANTS' WRONGDOING

A. John Doe Defendants Engaged in Unlawful Trading Activities Relating to the VIX

58. VIX futures and options settlements dates are particularly vulnerable to manipulation because many volatility funds, including volatility exchange traded funds and exchange traded notes, use this time to rebalance their volatility positions to meet their investment mandates and objectives. VIX-based ETNs and ETFs account for a sizeable portion of the VIX futures demand, with the ETNs offered by Credit Suisse and Nomura alone possessing 38% of the 629,000 open VIX futures contracts. Because these fund managers need to match an existing mandate and thus have limited flexibility in their trading strategies or positions, seasoned manipulators can use this inflexibility to push the VIX against these managers, knowing that they must buy or sell a certain quantity of VIX futures and options in order to meet the investment objective of the fund.

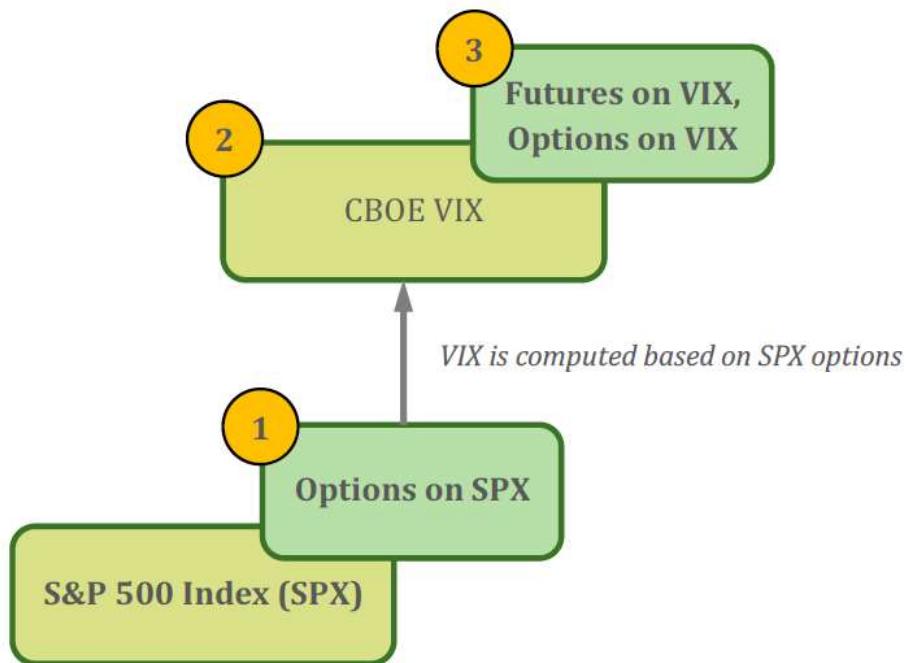
59. Further magnifying the vulnerabilities of the VIX to manipulation is the fact that, as one commentator noted, “You have an incredibly active market now in Vix futures, and now the market is clearly moving Vix itself. You have potential for a circular system.”⁸ As explained in more detail below, the ubiquity of VIX futures and options provides ample incentive for sophisticated manipulators, such as the John Doe Defendants, to manipulate the VIX for

⁸ Miles Johnson, Vix futures co-inventor: ‘the tail grabbed the dog’ this week, Financial Times (Feb. 8, 2018), <https://www.ft.com/content/8aaee774-0cdd-11e8-8eb7-42f857ea9f09>.

purposes of benefiting on positions in these derivatives. Sandy Rattray, who helped develop the VIX futures contracts, confirmed as much.

60. During the Class Period, John Doe Defendants used a variety of means to manipulate the VIX, including through aggressive uneconomical bidding and trading of SPX options and spoofing. John Doe Defendants and other traders aggressively submitted uneconomical bids and offers for OTM SPX options for purposes of influencing the outcome of the VIX settlement on dates when VIX options and futures expired.

61. Despite the high cost of overbidding on SPX options during the VIX settlement window, John Doe Defendants were able to recoup these losses from the profits they reaped in existing positions they held in VIX futures and options, the values of which increased substantially when the VIX at settlement deviated from VIX values even the night before. The following flow chart helps explain this dynamic:



62. Using the graphic above, a John Doe Defendant could submit aggressive (higher) bids for OTM SPX options prior to 8:15 a.m., which is the cut-off for strategy orders. Bidding aggressively on OTM SPX options would have the effect of raising the value of the VIX during the SOQ. A John Doe Defendant who is long VIX futures, long VIX call options, or short VIX put options would profit from its upward manipulation of the VIX.

63. Conversely, a John Doe Defendant could submit aggressive (lower) offers for OTM SPX options prior to 8:15 a.m. Such offers would have the effect of suppressing the value of the VIX during the SOQ. A Defendant who is short VIX futures, short VIX call options, or long VIX put options would profit from its downward manipulation of the VIX.

64. In other instances, traders would engage in spoof bidding or offering in an attempt to induce other market participants to similarly bid and offer under the false belief there was increased market depth for SPX options. By spoofing these orders and inducing other market participants to engage in trading they would otherwise not engage in, but for the spoof orders, John Doe Defendants were also able to influence the VIX settlement, often to the benefit of existing positions they held in related VIX derivatives, such as futures and options.

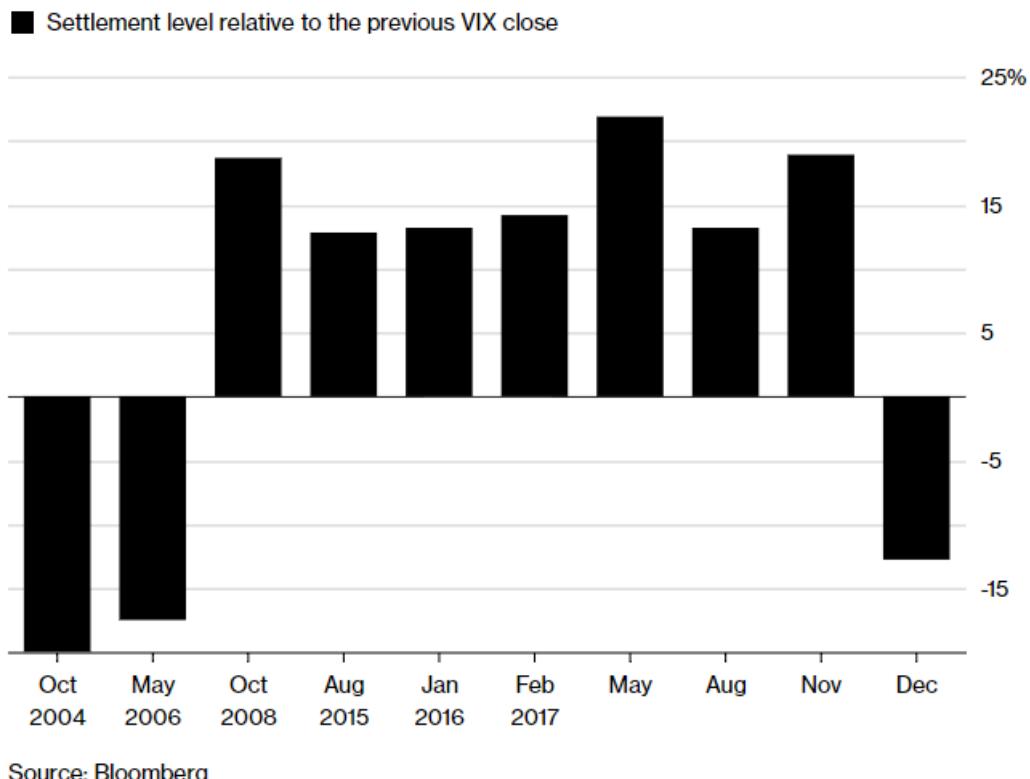
65. An April 2017 empirical study of the VIX market lends further support to allegations that the VIX was subjected to rampant manipulation. The study concluded that the VIX was “*susceptible to manipulation and that the aggregate evidence aligns itself with what one would expect to see in the case of market manipulation of certain settlements.*”⁹ The authors

⁹ Griffin Study at 37 (emphasis added).

of that study further concluded that “*the most natural explanation* for [the trading] patterns [they observed] *appears to be attempted manipulation.*”¹⁰

66. Despite ongoing concerns about the potential for manipulation of the VIX and its related derivatives, manipulation shows no signs of abating. As noted in a January 2018 Bloomberg report, 2017 saw five of the ten biggest divergences between the VIX at settlement and the VIX at the end of trading the day before—a clear sign that trading activity on VIX settlement days was pushing the VIX to artificial levels.

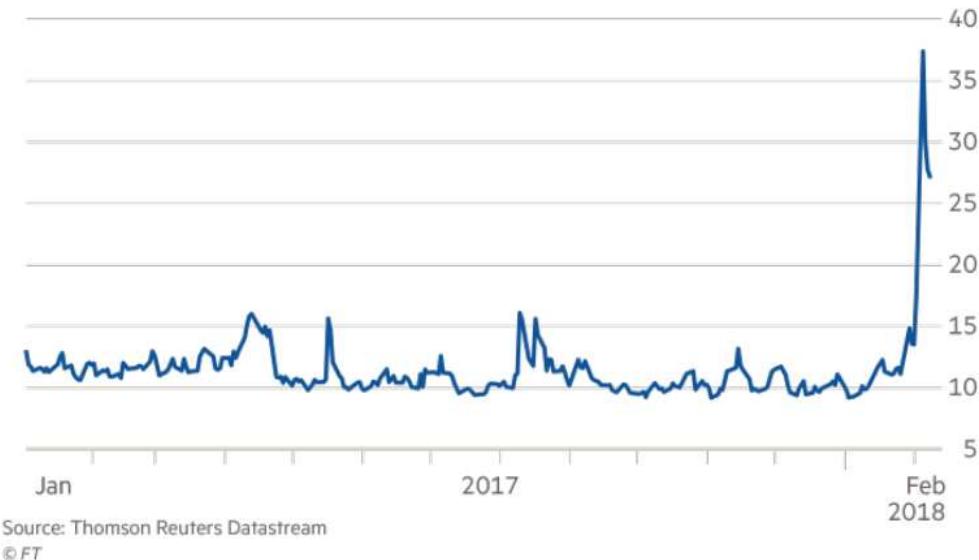
Figure 4: VIX Settlement Levels Relative to Previous Day’s Close



¹⁰ Griffin Study at 5 (emphasis added).

67. More recently, on February 5, 2018, the VIX spiked dramatically and unexpectedly, wiping out billions in market capitalization for volatility ETFs and ETNs, including those offered by Credit Suisse (VelocityShares Daily Inverse VIX Short Term ETN), Nomura (VIX Inverse ETN), and ProShares (Short VIX Short-Term Futures ETF). Figure 5 below shows the unprecedented spike in the VIX on February 5, 2018.

Figure 5: VIX Movement



68. Following the February 5, 2018 spike in the VIX, on February 12, 2018, a law firm, on behalf of an anonymous whistleblower, wrote an open letter to the enforcement heads of the SEC and the CFTC, imploring them to open an investigation into potential VIX manipulation.

69. The whistleblower claimed there was a “market manipulation scheme that takes advantage of a pervasive flaw in the Chicago Board Options Exchange (CBOE) Volatility Index (VIX). The flaw allows trading firms with sophisticated algorithms to move the VIX up or down

by simply posting quotes on S&P options and without needing to physically engage in any trading or deploying any capital.”¹¹

70. Commenting on the February 5, 2018 VIX jump, the whistleblower stated that “the liquidation of the VIX ETPs [exchange traded products] last week was not due solely to flaws in the design of these products, but *instead was driven largely by a rampant manipulation of the VIX index.*”¹²

71. The increased attention on the VIX has prompted regulators to respond. While the CBOE denies that the VIX is manipulated, FINRA, which by agreement provides regulatory support to the CBOE’s Business Conduct Committee in enforcement actions, has opened an investigation into manipulation of the VIX. More recently, the CFTC and SEC have also reportedly begun investigations into VIX manipulation.

B. Economic Evidence Supports Plaintiff’s Allegations of VIX Manipulation

72. Economic evidence supports the notion that the VIX has been subjected to manipulation for several years. Professor John. M. Griffin and Amin Shams of the McCombs School of Business at The University of Texas at Austin analyzed data from January 2008 through April 2015 and found trading patterns that are consistent with the manipulation of the VIX, and in turn, its related derivative instruments (the “Griffin Study”). Specifically, the Griffin Study found that during the time when there were monthly VIX settlements, “highly statistically and economically significant trading volume spikes occur in the underlying SPX options.”¹³

¹¹ Ltr. from Jason Zuckerman to James McDonald, et al., at 1 (Feb. 12, 2018).

¹² Ltr. from Jason Zuckerman to James McDonald, et al., at 2 (Feb. 12, 2018) (emphasis added).

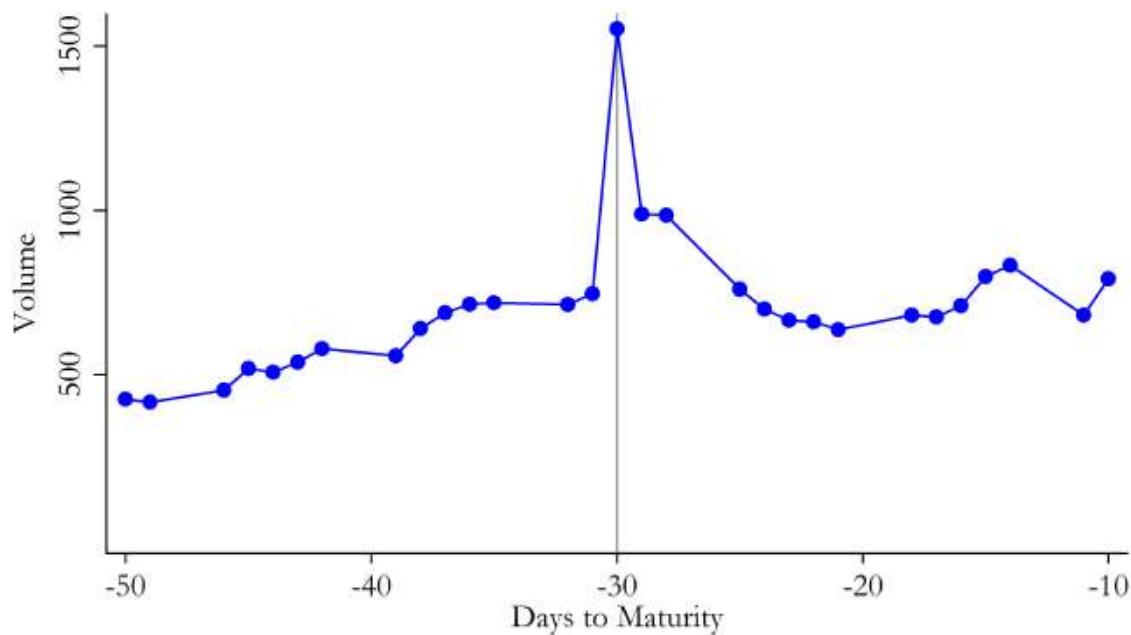
¹³ Griffin Study, at 2.

1. SPX options trading volume spikes at monthly VIX derivatives settlements.

73. The Griffin Study analyzed daily trading volumes across all SPX options.

Typically, trading volume for these options is low and steadily increases as these options approach expiry. However, there is a pronounced spike in SPX option trading volume exactly 30 days prior to expiration—*i.e.*, the date that the VIX derivatives settle. Figure 6 below demonstrates this increased spike in SPX options volume at the VIX settlement date.

Figure 6: SPX Options Trading Volume

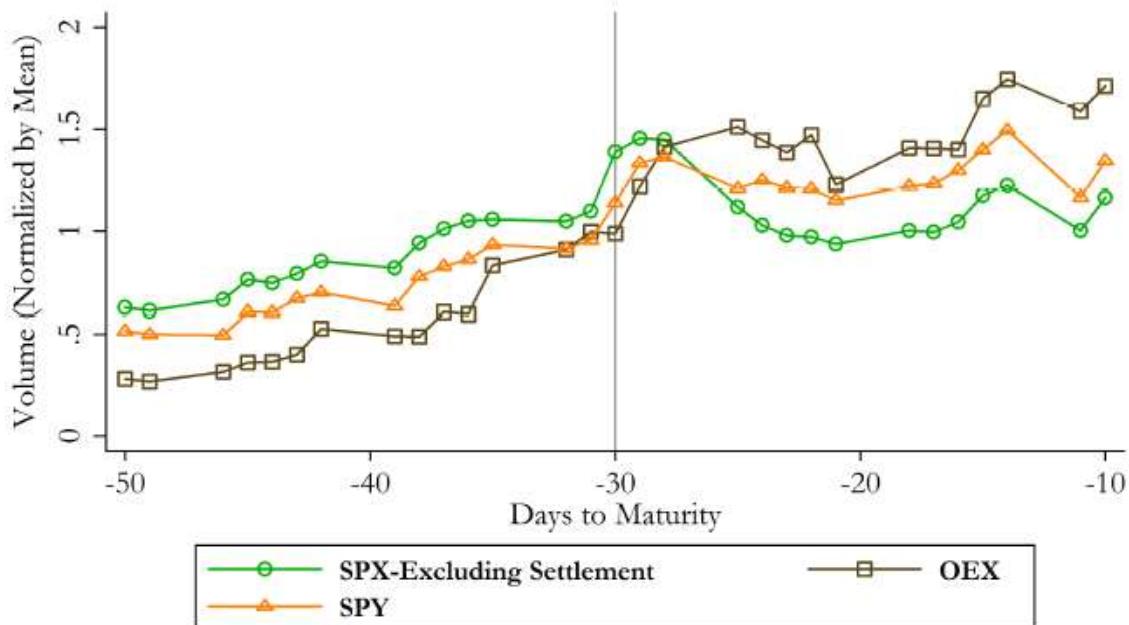


74. The spike in SPX options trading volume on settlement days is even more pronounced when the authors excluded SPX options traded during the VIX settlement window on the settlement date. When that trading is removed, the spike seen in Figure 6 above disappears.

75. Figure 7 below shows the absence of any volume spike in SPX options trading when options trading around the settlement window is excluded (green line). Further, to test the robustness of this observation, the authors also examined trading volumes on closely related options series—S&P 100 options (“OEX options”) and options on the SPDR S&P 500 ETF (“SPY options”). The S&P 100 and S&P 500 track each other very closely, so any market-wide deviations affecting the S&P 100 would be picked up in the S&P 500, and their related options series. But unlike SPX options, OEX options are not an input into VIX settlement calculations.

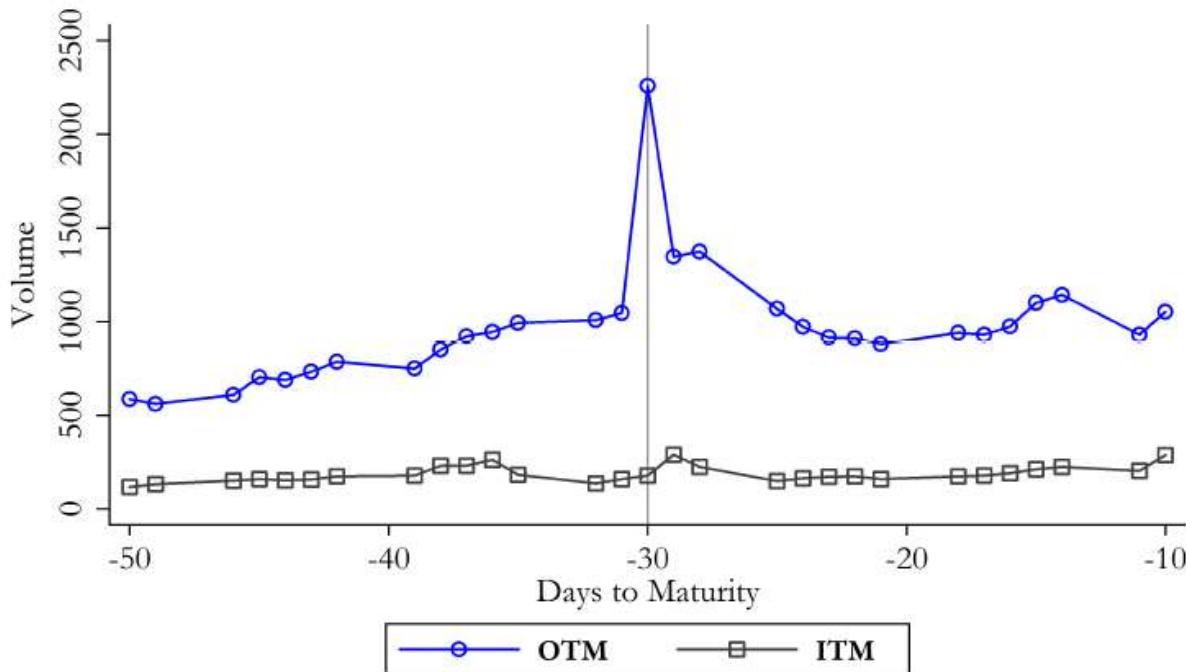
76. Similarly, the SPDR S&P 500 ETF tracks the S&P 500 index and has the same fundamentals. However, unlike the SPX options, there is no volatility index derived from SPY options trading. As can be in Figure 7 below, there is no meaningful spike in trading activity around the VIX settlement for these other options, signaling that the spike in SPX options trading volume on settlement days is untethered to broader market forces.

Figure 7: SPX, OEX, SPY Options Daily Trading Volume (Normalized by Mean)



77. The Griffin Study also found that within the SPX options volume spike, trading volume was almost exclusively driven by the trading of OTM SPX options, as shown in Figure 8 below. ITM SPX options, which are excluded from the VIX derivatives settlement procedures, see no similar spike in volume.

Figure 8: OTM and ITM Options Daily Trading Volume



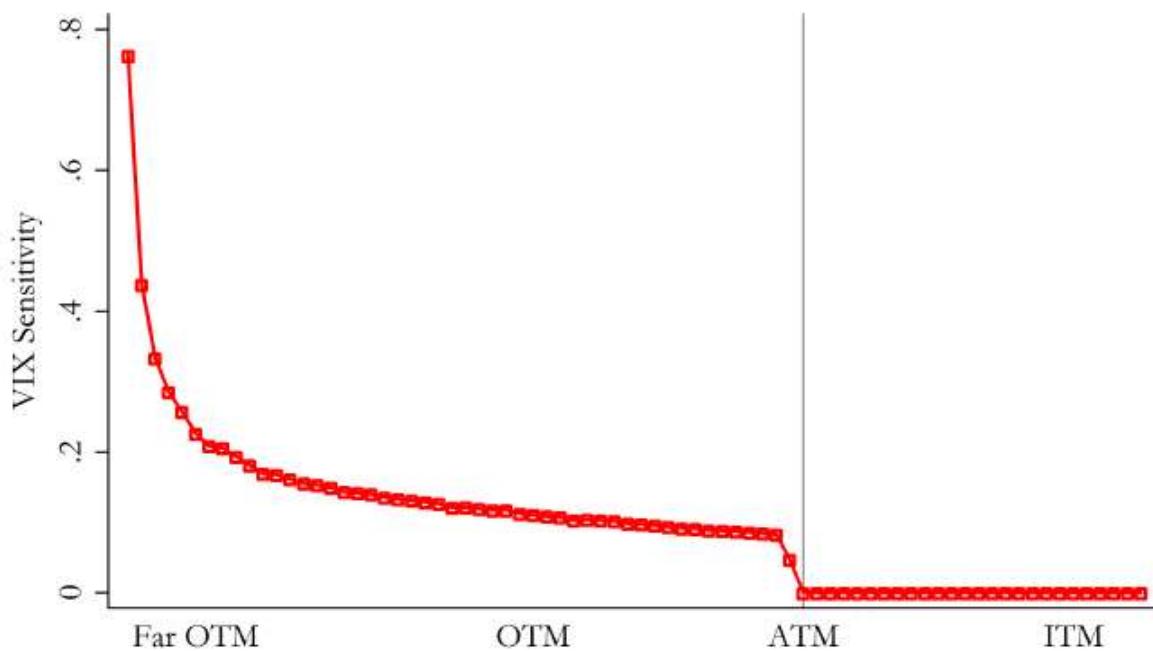
78. This observation is significant because the VIX settlement is weighted to favor OTM options. Thus, the increase in OTM SPX option trading volume strongly suggests that traders are targeting their trading towards these options as means of influencing the VIX settlement, specifically on days when VIX futures and options settle.

2. The VIX is highly sensitive to OTM options and those options' trading volumes are disproportionately larger on settlement dates.

79. The Griffin Study also examined the VIX's sensitivity to ITM and OTM options and whether either of these options' volumes changed at the VIX settlement. Specifically, the authors measured the VIX's sensitivity to put options at each strike, as the basis point change in the VIX due to a \$0.05 change in that specific option's price, while keeping all other options' prices the same for all other strikes.

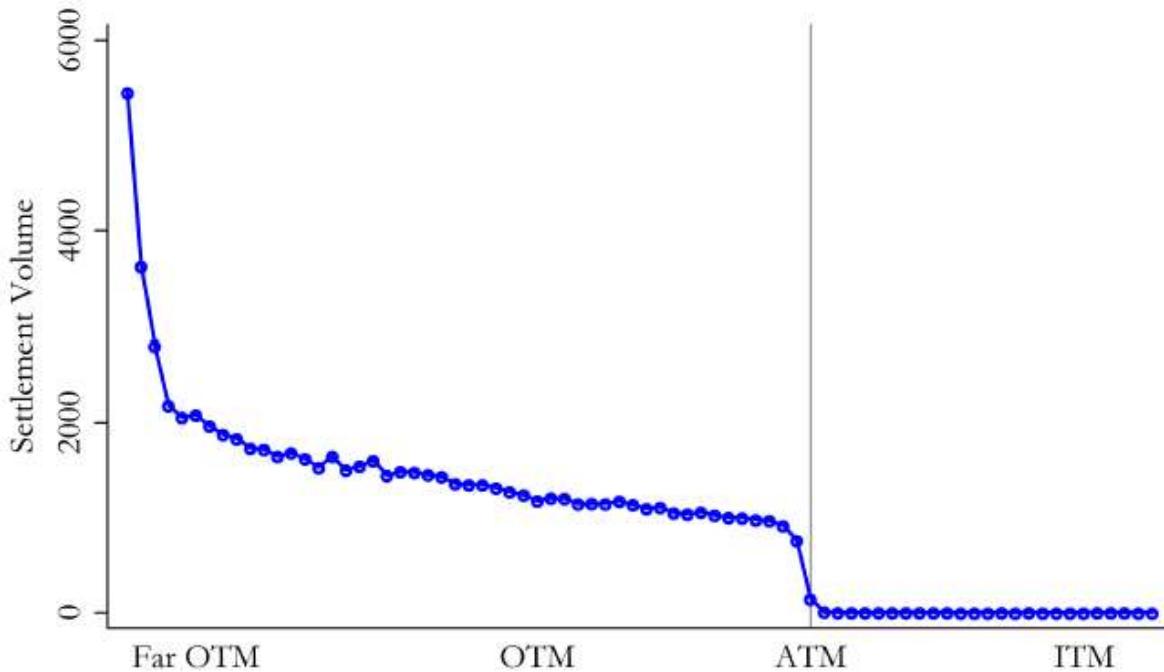
80. Figure 9 below plots the sensitivity of the VIX to different strikes ranging from far OTM to ITM. As can be seen in the graph, the VIX is significantly more sensitive to the further OTM put options than those that are nearly at-the-money ("ATM") or even ITM. This demonstrates that the VIX formula is disproportionately weighted towards the OTM strike ranges, and that OTM orders have proportionally larger impact on the VIX settlement results.

Figure 9: VIX Sensitivity to SPX Put Options

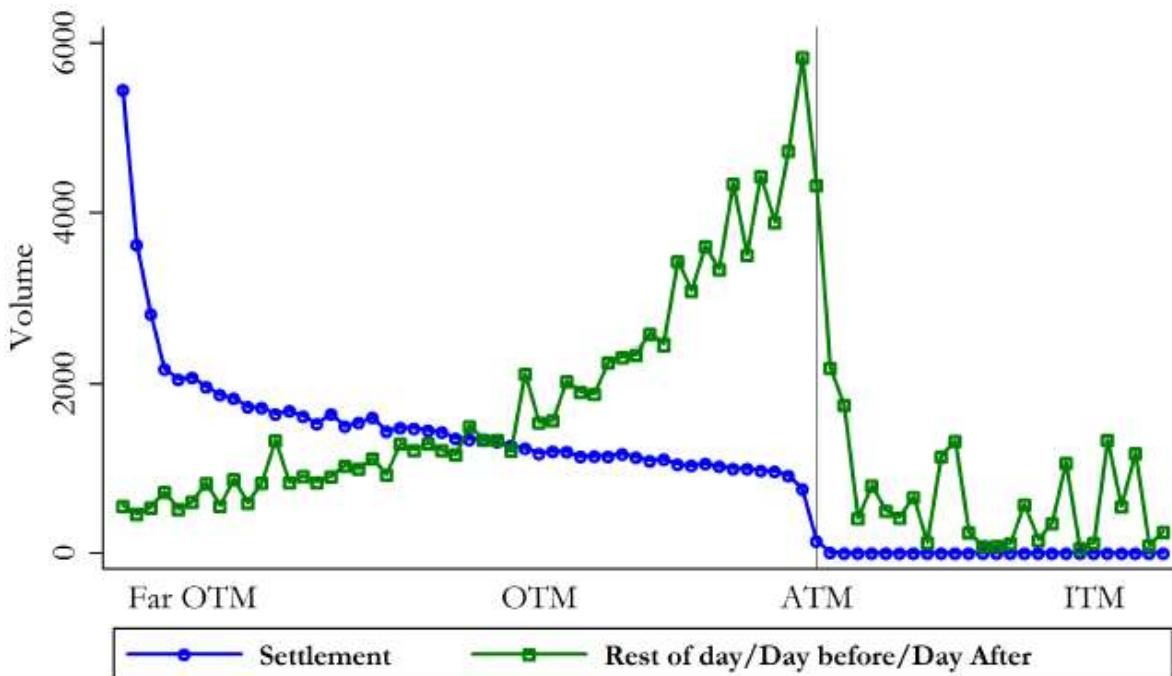


81. Figure 10 below shows SPX put options' volume across strike price ranges at the VIX settlement and demonstrates that the volume of put orders increases as SPX puts become more OTM.

Figure 10: Put Options Trading Volume at VIX Settlement



82. To show that trading activity in far OTM SPX put options was specifically targeting the settlement of VIX, the Griffin Study also examined order volume for a spectrum of SPX put options for other non-settlement dates, as well as times during the settlement date, not including the settlement window. Figure 11 below shows that the far OTM SPX put options were a non-factor in terms of trading volume during these other times.

Figure 11: SPX Put Options Volume at Settlement vs. Daily Volumes on Other Days

83. The results in Figure 11 are consistent with traders seeking to manipulate the VIX by submitting larger order volumes as the sensitivity for certain orders increases.

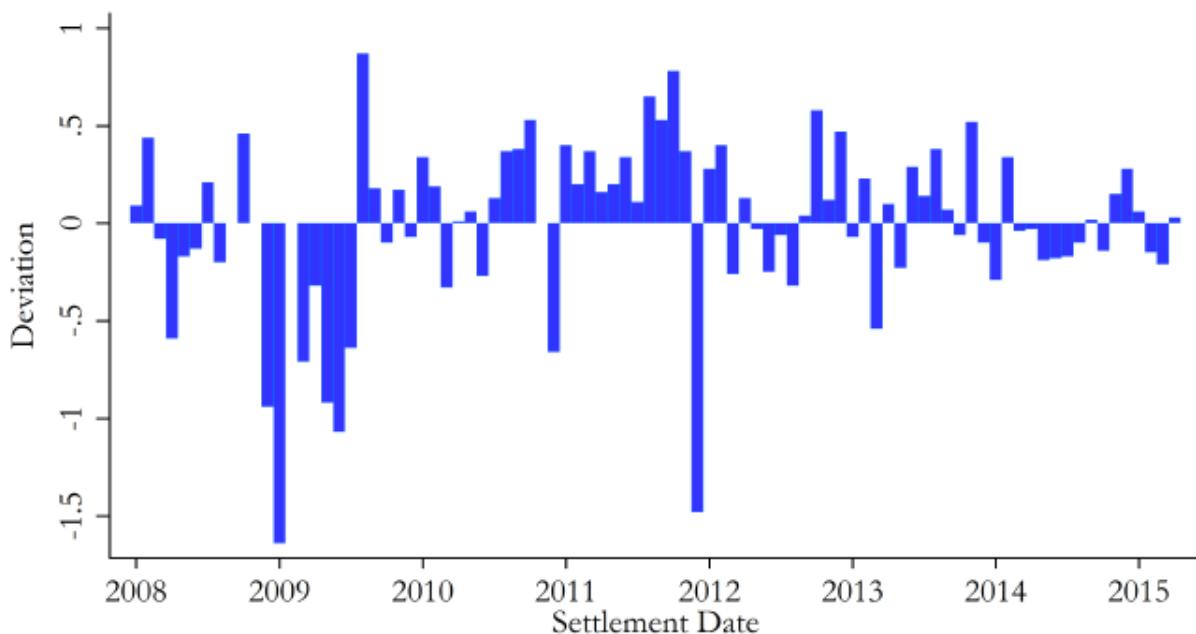
3. Manipulation made the VIX and VIX derivative prices artificial.

84. The Griffin Study also examines whether the trading behavior described above caused distortions in the VIX, and in turn, its related derivatives. To measure whether price movements in SPX options caused deviations in the VIX, the Griffin Study compared (i) the VIX calculated from SPX options prices at settlement to (ii) the VIX calculated from the mid-quote of SPX options soon after (*i.e.*, 25 seconds) the CBOE market open at 8:30 a.m. Central Time (the “benchmark period”). Presumably, if traders did not trade differently during the VIX settlement than at other, non-settlement times (*e.g.*, the benchmark period), there should be little to no difference in the VIX between these two periods.

85. Further, to control for deviations that may be caused by including different strike ranges at settlement and at the benchmark period, the authors used the exact same range of non-zero bid options included in both the settlement and the benchmark period.

86. Figure 12 below shows the average deviations (measured in basis points) in the VIX. As seen in Figure 12, there were significant deviations in the two VIX measurements, *both positive and negative*, during the period January 2008 through April 2015. The average absolute deviation is 31 basis points per settlement day. This is consistent with traders trading to specifically influence the VIX at settlement.

Figure 12: VIX Deviations at Settlement



87. The Griffin Study also used other benchmarks to test the robustness of the results in Figure 12. Each test confirmed the results above and was statistically significant.

88. The Griffin Study next attempted to identify the source of the VIX deviations and examined SPX options in the following groups: (1) close-in OTM puts; (2) further OTM puts;

(3) very far OTM puts; and (4) call options. The authors calculated the deviations caused by each subgroup by aggregating the deviation caused by each individual option in that subgroup settled at the actual settlement price, while holding the prices of other options the same as a benchmark.

89. The Griffin Study found that in days with large positive deviations, 29% of the deviations were caused by close-in OTM puts, 22% from further OTM puts, 22% from very far OTM puts, and 28% from the calls. For negative deviation days the percentages are 44%, 24%, 10%, and 23%.

90. The Griffin Study also found that the VIX deviations could not be arbitrated away. This is because OTM SPX options usually have wide bid-offer spreads outside of the VIX settlement window, with the far OTM puts that the VIX is particularly sensitive to having even wider bid-offer spreads outside the settlement window.

91. The Griffin Study finds that arbitrage opportunities are limited because often the price deviations caused at the VIX settlement are within the wide post-settlement bid-offer spread. Because of the lack of arbitrage, the deviations remain in the market prices going forward.

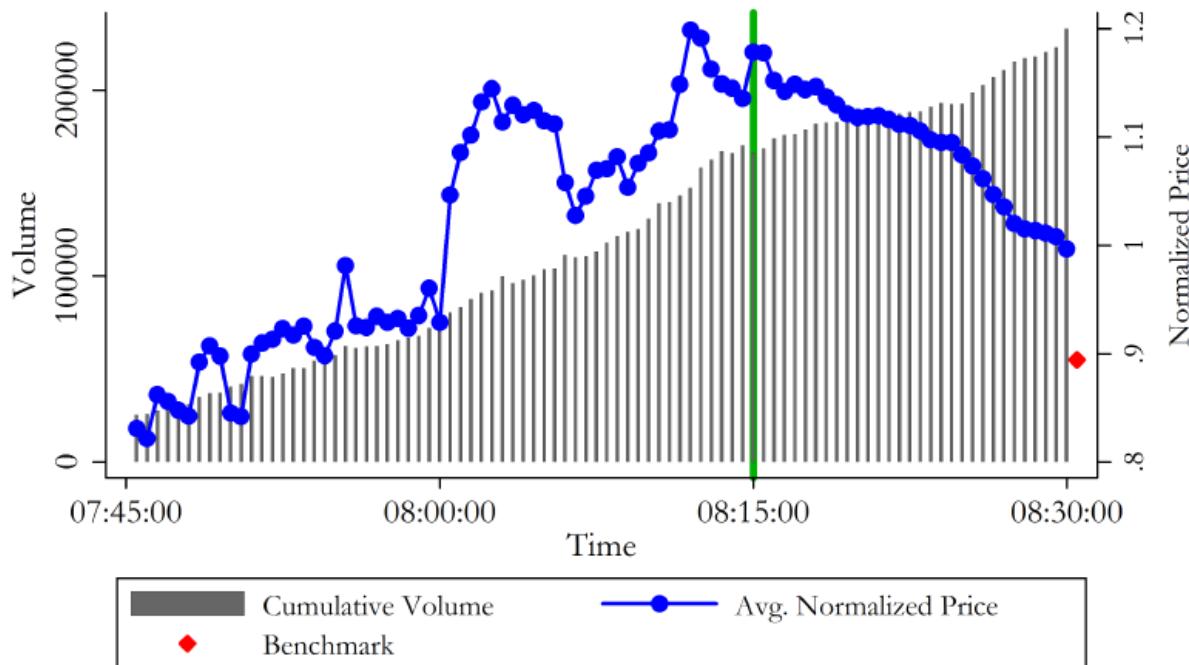
4. Traders increased price pressure on the VIX through aggressive bid activity around the time of the SOQ window on settlement dates.

92. The Griffin Study also sought to explain the mechanism by which VIX manipulation occurred. Acknowledging existing empirical literature showing that pre-open orders can have lasting price impacts, even without the execution of any trades, the Griffin Study studied the CBOE's VIX Imbalance Reports, which show whether, during the time leading up to the opening, there were more buy orders than sell orders, or vice versa. Such data can show when there was buy-side pressure—*i.e.*, if there were more buy orders than sell orders—or when there

was sell-side pressure—*i.e.*, if there were more sell orders than buy orders. These Reports contain data concerning bid and offer prices, size of orders, and imbalance quantities. It also provides the last sales price, which is used to calculate the indicative price or what the market-clearing price would be if the auction cleared at that time.

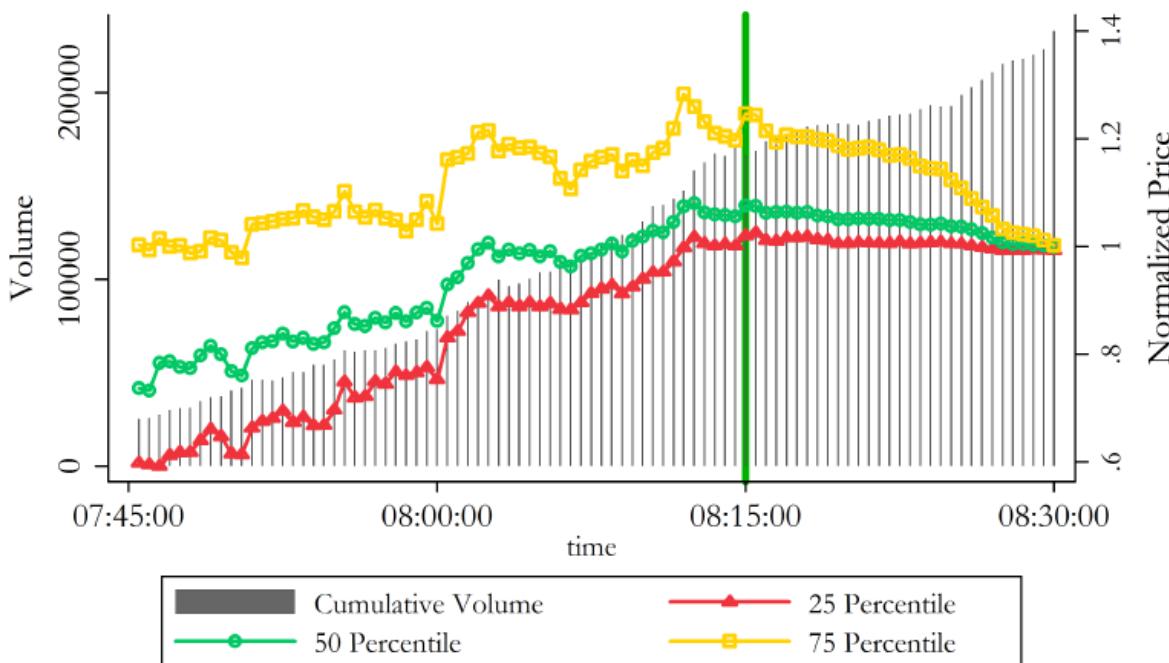
93. The Griffin Study found that on days where the VIX experienced positive deviations (using the analysis described in ¶ 84 above), the average indicative SPX options price starts low in the morning and increases from 7:45 a.m. to 8:15 a.m. Central Time. After 8:15 a.m., prices revert somewhat heading into the opening at 8:30 a.m. This pattern is consistent with placement of aggressive buy orders ahead of the settlement window. Figure 13 below shows this pattern of increasing prices ahead of the settlement window.

Figure 13: Months with Positive Deviation (Average)



94. Indeed, this pattern holds true even when examining the 25th, 50th, and 75th percentile of days with positive deviations, as shown in Figure 14 below.

Figure 14: Months with Positive Deviation (25, 50, and 75 Percentiles)



95. The Griffin Study also found that in the pre-open period on VIX settlement dates, the bid-offer spread is largely negative—meaning that bids are being placed above offer prices, or that offer prices are being placed below bid prices—indicating that traders are submitting aggressive buy or sell orders. This is significant because in a balanced market of buyers and sellers, the bid-offer spread should be positive.

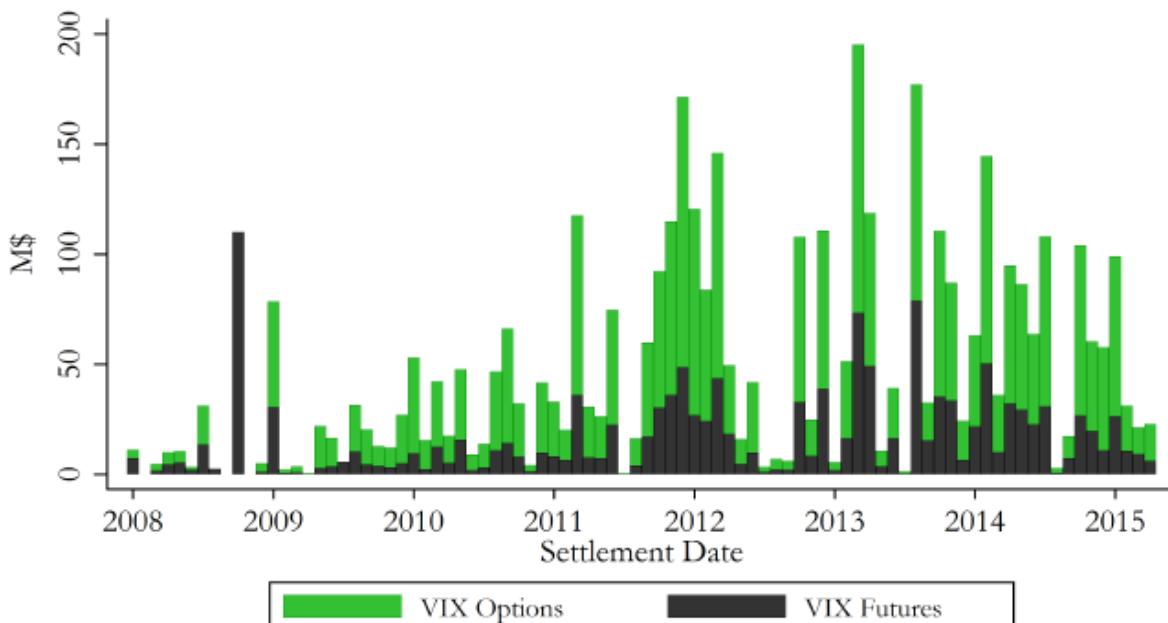
96. Moreover, the negative spreads are only found in the OTM SPX options, not the ITM SPX options. This is consistent with traders heavily trading the types of SPX options

(namely OTM SPX options) that will have the greatest effect on the outcome of the VIX settlement.

5. Distortions in the VIX cost investors hundreds of millions of dollars, if not billions.

97. To show how these VIX deviations affected VIX futures and options, the Griffin Study also analyzed trading data for these derivatives. The Griffin Study calculated the distortions in VIX futures and options by measuring the open interest of VIX futures and ITM VIX options at the close of trading the day before the settlement date, multiplied by the settlement deviation. Figure 15 below shows that the VIX deviations seen in Figure 14 above caused significant price distortions in the VIX futures and options, both of which are benchmarked off the VIX. As can be seen in Figure 15, the VIX deviations cost investors hundreds of millions of dollars on their VIX futures and options.

Figure 15: Price Distortions in VIX Futures and Options



98. All totaled, according to the Griffin Study, the price distortion for VIX futures and options caused by VIX deviations is \$1.81 billion between the period January 2008 through April 2015, with the average distortionary cost per settlement being \$21 million.

6. Alternative explanations do not explain VIX trading behavior.

99. The Griffin Study also sought to explore potential alternative explanations for the trading abnormalities described above. The authors posit three principal alternative explanations. *First*, the settlement period is a period of coordinated liquidity, which improves the ability of traders to buy and sell even otherwise illiquid OTM SPX options. *Second*, hedgers could be taking positions in SPX options prior to settlement to hedge their VIX derivative positions and then unwind those positions when the VIX derivatives settle. *Third*, hedgers could also be rolling over their VIX derivative positions to SPX options as their VIX derivatives settle/expire. As explained in more detail below, the authors found that none of these explanations adequately explained the trading behavior described above.

100. ***Improved liquidity.*** Far OTM SPX options are typically very illiquid and costly to trade due to wide bid-offer spreads. The Griffin Study posits that given the overall improvement of liquidity associated with VIX derivatives settlement periods, traders can take advantage of this window to trade and take positions in these otherwise illiquid options. But if that is true, then one would expect both far OTM put *and call* options should experience an equal uptick in trading volume.

101. But the Griffin Study found that far OTM call options did not trade actively during the VIX settlement. This is consistent with traders trading in a way that is designed to influence the VIX because far OTM calls have low weighting in the VIX settlement procedures.

By contrast, OTM puts, which are given considerable weight in the VIX settlement, are more heavily traded during the VIX settlement window.

102. ***Hedging VIX derivatives with SPX options.*** Another possible explanation for the trading behavior described above is that traders who have VIX derivatives positions may be hedging their exposure to those positions by trading in SPX options. At the time when VIX derivatives settle/expire, traders may be unwinding SPX option hedges, resulting in abnormal trading activity, when compared to other dates or even other times on the settlement date.

103. To test this explanation, the authors conducted two tests. First, the Griffin Study examined whether there were sizeable open interest and volume in SPX options before the settlement, on the theory that there would need to be large open interests to match the increased volume in those options at the VIX derivatives' expiry. However, the Griffin Study found that open interest in far OTM options was minimal before settlement. It also suggests that many, if not most, of the SPX open interest at settlement was *new* positions, rather than the unwinding of existing positions.

104. Second, the authors examined the options that are right at the threshold of ITM or OTM. It is nearly impossible for a trader to know which options will be included in the settlement when she opens the hedging positions in SPX options prior to the settlement. Thus, when settlement time arrives, the trader will have some options that were OTM in the past but now are ITM and therefore not included in the VIX. The trader should still unwind these positions at settlement because they no longer have the need to hedge. Accordingly, one should see volume spikes for both barely ITM and barely OTM options.

105. However, contrary to their hypothesis, The Griffin Study finds there is no spike in trading volume for ITM options, suggesting that the trading patterns above are inconsistent with hedgers unwinding positions opened prior to their VIX derivatives' settlement.

106. ***Rolling VIX derivatives into SPX options.*** The last alternative explanation is that as VIX derivatives settle/expire, traders replace them with SPX options. By rolling their derivatives positions into SPX options, traders are, in effect, entering into a synthetic variance swap.¹⁴

107. The Griffin Study tested this hypothesis in two ways. *First*, the authors examined SPX options trading data prior to and after the introduction of VIX futures. If options traders needed to hedge short-term volatility using SPX options, then one would expect to see large volumes of SPX options trading in the months with no VIX futures. When the Griffin Study compared the data on SPX options trading volumes in months with and without VIX futures settling, they found that while there was no difference in volume for ITM options, there was a significant difference in volume of OTM options, which drive VIX derivative settlement values. Specifically, the Griffin Study found that OTM options trading volume increased significantly in months *with* VIX futures expiring. This is inconsistent with a hedging explanation but consistent with traders seeking to trade SPX options to benefit positions in VIX derivatives.

108. *Second*, the Griffin Study investigated the trading patterns on exchange-traded variance swap futures contracts around settlement times. Traders looking to replace expiring VIX derivatives could purchase S&P 500 variance futures, which have been actively traded on

¹⁴ Variance swaps are a derivative that allows investors to speculate or hedge risk associated with volatility of some underlying product (or here, an equity index). One leg of the swap will pay an amount based on the variance of price changes in the underlying index (or product). The other leg will pay a fixed amount (also known as the "strike"), which is set at the swap's inception.

the CBOE since December 2012. Thus, if traders were simply rolling settling/expiring positions, one would expect that there would be a spike in S&P 500 variance futures trading around the time of the VIX derivatives settlements. Yet the data showed no such spike in activity, a behavior that is inconsistent with hedging exposure to VIX derivatives.

109. The Griffin Study demonstrates not only that the VIX is vulnerable to manipulation, but that there is evidence to show that it has in fact been manipulated by the John Doe Defendants.

7. Plaintiff's own experts confirm the robustness of the Griffin Study findings.

110. Plaintiff retained experts, who similarly conducted preliminary analyses of VIX data to determine whether any anomalous patterns appeared in the data. Specifically, they analyzed whether there were any deviations between the VIX futures settlement price and the opening VIX value on settlement days. Both monthly and weekly VIX futures were examined, albeit separately. For monthly VIX futures the period examined was May 22, 2013 through February 15, 2018. Because weekly VIX futures were introduced more recently, the period examined for these contracts was August 5, 2015 and February 15, 2018.

111. Deviations were measured as the difference between the settlement price of VIX futures and the VIX opening value. To meaningfully compare VIX futures, which are measured in price, to the VIX, which is measured in points, the experts converted the VIX futures prices into "VIX points." Accordingly, one VIX point is equal to \$1,000 for *each* VIX futures contract.

112. Plaintiff's experts found that there were significant price deviations over the period May 22, 2013 through February 15, 2018, as shown in the histograms below for VIX

monthly and weekly futures. Each histogram measures not only the magnitude of the deviation between the VIX futures at settlement and VIX opening value, but also the number of times (frequency) during the examined period that each deviation was observed. Each bar on the histograms below represents a deviation of 0.1 VIX points.

Figure 16: Histogram of Deviations between VIX (monthly) Settlement Price and Opening VIX Value

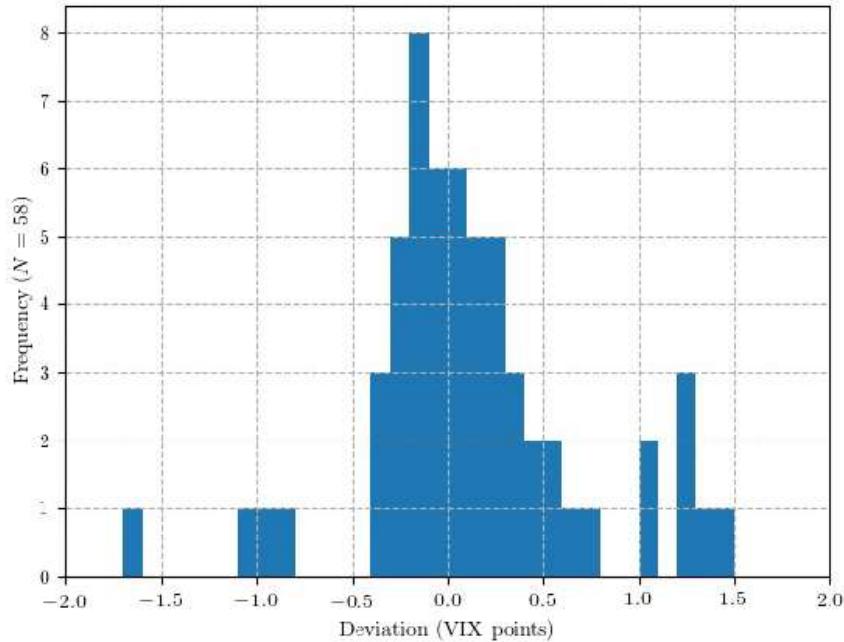
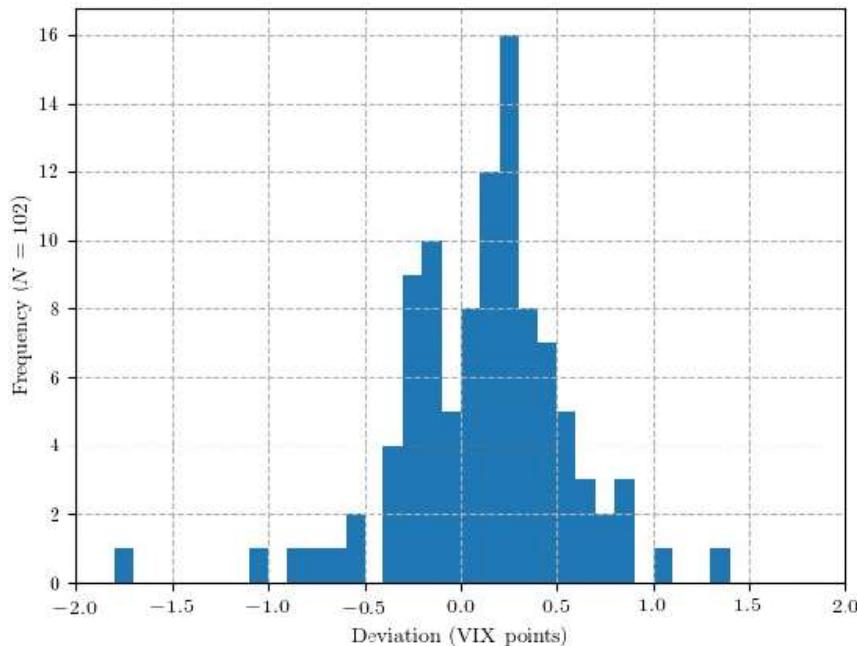


Figure 17: Histogram of Deviations between VIX (weekly) Settlement Price and Opening VIX Value



113. As can be seen in each of the histograms, during the examined period, the VIX futures settlement price deviated significantly from the opening VIX value on settlement dates, both positively and negatively. These deviations had significant consequences for VIX futures traders on these dates.

114. For example, a positive deviation of a mere 0.1 VIX points would cost a trader who was short VIX futures at settlement \$100 per contract. Given that the average open interest in VIX futures contracts over the examined period was approximately 450,000 contracts, if one assumes that there were an equal number of long and short positions (*i.e.*, 450,000 for each), the aggregate effect of even a 0.1 VIX point deviation would be **\$45,000,000**. Conversely, if the 0.1 VIX points deviation was negative, long VIX futures holders would have lost **\$45,000,000**.

115. Further, as the magnitude of the deviation increases, the impact on the market increases, accordingly. Again, assuming an even number of short and long positions in the market and open interest of 450,000 contracts, a 0.5 VIX point positive (negative) deviation at settlement would cost short (long) VIX futures holders **\$225,500,000**. A 1.0 VIX point positive (negative) deviation would have cost short (long) VIX futures holders **\$450,000,000**. These numbers likely underestimate the true costs because they include only the impact on VIX futures, not VIX options.

116. These preliminary analyses confirm and extend the key findings in the Griffin Study: (a) that there were significant deviations between the settlement value of the VIX and VIX futures on settlement dates; and (b) cumulating those deviations across the monthly or weekly settlements in the Class Period these deviations cost traders who held VIX futures through settlement hundreds of millions, if not billions, of dollars over the Class Period.

C. The CBOE Defendants Permitted Rampant Manipulation of the VIX, VIX Futures, and Options and Failed to Take Appropriate Action.

117. The CEA requires registered entities like the CBOE Defendants to “establish, monitor, and enforce compliance with the rules of the contract market, including . . . rules prohibiting abusive trade practices on the contract market.” 7 U.S.C. §7(d)(2)(A). Registered entities must, among other things:

- (a) “[H]ave the capacity to detect, investigate, and apply appropriate sanctions to any person that violates any rule of the contract market” (7 U.S.C. §7(d)(2)(B));
- (b) “[L]ist on the contract market only contracts that are not readily susceptible to manipulation” (7 U.S.C. §7(d)(3));

- (c) “[H]ave the capacity and responsibility to prevent manipulation, price distortion, and disruptions of the delivery or cash-settlement process through market surveillance, compliance, and enforcement practices and procedures” (7 U.S.C. §7(d)(4)); and
- (d) “[E]stablish and enforce rules – (A) to protect markets and market participants from abusive practices committed by any party, including abusive practices committed by a party acting as an agent for a participant; and (B) to promote fair and equitable trading on the contract market” (7 U.S.C. §7(d)(12)).

118. In response, the CBOE has in place a variety of pertinent rules governing traders' conduct on the exchange, including:

Rule 4.1. Just and Equitable Principles of Trade

No Trading Permit Holder shall engage in acts or practices inconsistent with just and equitable principles of trade. . . .

Rule 4.2. Adherence to Law

No Trading Permit Holder shall engage in conduct in violation of the Securities Exchange Act of 1934, as amended, rules or regulations thereunder, the Bylaws or the Rules of the Exchange, or the Rules of the Clearing Corporation

Rule 4.7. Manipulation

- (a) No Trading Permit Holder shall effect or induce the purchase, sale or exercise of any security for the purpose of creating or inducing a false, misleading, or artificial appearance of activity in such security or in the underlying security, or for the purpose of unduly or improperly influencing the market price of such security or of the underlying security or for the purpose of making a price which does not reflect the true state of the market in such security or in the underlying security.

119. The CFE has similar rules in place:

601. Fraudulent Acts

Neither a Trading Privilege Holder nor any of its Related Parties shall engage or attempt to engage in any fraudulent act or engage or attempt to engage in any scheme to defraud, deceive or trick, in connection with or related to any trade on or other activity related to the Exchange or the Clearing Corporation.

602. Fictitious Transactions

Neither a Trading Privilege Holder nor any of its Related Parties shall create fictitious transactions or execute any Order for a fictitious transaction with knowledge of its nature.

603. Market Manipulation

Any manipulation of the market in any Contract is prohibited. Orders entered into the CFE System for the purpose of generating unnecessary volatility or creating a condition in which prices do not or will not reflect fair market values are prohibited and any Trading Privilege Holder (including its respective Related Parties) who makes or assists in entering any such Order with knowledge of the purpose thereof or who, with such knowledge, in any way assists in carrying out any plan or scheme for the entering of any such Order, shall be deemed to have engaged in an act detrimental to the Exchange.

604. Adherence to Law

No Trading Privilege Holder (including its Related Parties) shall engage in conduct in violation of Applicable Law, the Rules of the Exchange, the Rules of the Clearing Corporation (insofar as the Rules of the Clearing Corporation relate to the reporting or clearance of any transaction in Contracts) or any agreement with the Exchange.

120. Rules are only effective if they are enforced. With respect to the manipulation of VIX, they were not. Despite having rules barring manipulative conduct (and the accompanying enforcement regulations to prosecute any related wrongdoing against traders), the CBOE and CFE failed to enforce them. Indeed, they were complicit in the manipulation of the VIX. As a result of their failure to enforce their own rules, there was rampant manipulation of the VIX by the John Doe Defendants over an extended period of time.

121. There was good reason why the CBOE Defendants turned a blind eye to enforcing rules to prevent VIX manipulation: trading volume is the lifeblood of these exchanges. CBOE Defendants derive substantial revenues from fees earned on each trade on their platforms, as seen in the CBOE’s financial filings. For example, in a CBOE SEC Form 10-K, dated February 21, 2014 for fiscal year 2013, the CBOE stated that “The primary and largest source of operating revenues is transaction fees,” with “[t]ransaction fees account[ing] for 69.4%, 69.7%, and 73.4% of total operating revenues for the year ended December 31, 2013, 2012 and 2011, respectively.”¹⁵

122. These figures have only grown with time. In a 2017 filing, the CBOE stated: “Transaction fees accounted for 70.5%, 71.9% and 70.9% of total operating revenues for the years ended December 31, 2016, 2015 and 2014, respectively.”¹⁶ Specifically, “index options and futures contracts” were driving the CBOE’s revenue train. Index options and futures contracts, which include VIX options and VIX futures, accounted for “88.2%, 82.9%, and 81.8% of [the CBOE’s] transaction fees for the years ended December 31, 2016, 2015 and 2014, respectively.”¹⁷ In the CBOE’s most recent annual filing, transactions fees continued to grow. At year-end 2017, fees associated with increased futures and index options volume, grew by 50% and 17.6% respectively.

¹⁵ CBOE Holdings, Inc., SEC Form 10-K, at 33, <http://otp.investis.com/clients/us/cboe1/SEC/sec-show.aspx?Type=page&FilingId=9800949-174708-256201&CIK=0001374310&Index=12300> (Feb. 21, 2014).

¹⁶ CBOE Holdings, Inc., SEC Form 10-K, at 42, <http://otp.investis.com/clients/us/cboe1/SEC/sec-show.aspx?Type=page&FilingId=11870646-18253-200054&CIK=0001374310&Index=11100> (Feb. 21, 2017).

¹⁷ *Id.*

123. Had CBOE Defendants vigorously enforced their own rules and regulations, they would have lost substantial revenues from the trading of VIX futures and options. First, vigorously enforcing their anti-manipulation and orderly market rules would have discouraged manipulators from entering the market. Second, if the CBOE Defendants exposed rampant manipulation of their own contracts, other participants would be less willing to trade these instruments because they would not be confident that they were trading in a manipulation-free market.

124. So rather than expose their warts, the CBOE Defendants let manipulators persist, only making rare, token efforts at enforcement, none of which resulted in significant penalties. But none of those enforcement actions readily identify the full scope of manipulative conduct that has wrought havoc on VIX futures and options, which rely on the VIX.

125. And in all events, the CBOE Defendants have continued to defend the integrity of their broken markets in the face of clear evidence to the contrary. For example, after the Griffin Study was published in 2017, the CBOE released a statement asserting that the study was premised on “fundamental misunderstandings” about the VIX, and suggested that the data included in the study was “entirely consistent with normal and legitimate trading behavior.”¹⁸ Upon information and belief, neither the CBOE nor CFE conducted a full investigation of the findings in the Griffin Study, or more generally into manipulation of the VIX.

126. Most recently, the CBOE released a statement after the whistleblower’s letter detailing the manipulation, again rejecting any suggestion of market manipulation: “This letter is replete with inaccurate statements, misconceptions and factual errors, including a fundamental

¹⁸ David Floyd, Is Someone Manipulating the VIX?, Investopedia (Feb. 15, 2018), <https://www.investopedia.com/news/someone-manipulating-vix-vxx/>.

misunderstanding of the relationship between the VIX Index, VIX futures and volatility.”¹⁹ Again, the statement was released just one day after the letter was released, clearly indicating that no investigation into the allegations took place.

127. Doubling down on its defense of the VIX, CBOE Vice President and Head of Research, William Speth, stated that “[t]here are structural safeguards built into the process of the calculation of the VIX settlement value that would hinder the type of manipulation the letter alleges.”²⁰ However, none of these putative safeguards was identified. Nor are they apparent in the rules governing the VIX.

128. As detailed above, the VIX formula *does not have adequate safeguards*, and the manipulation has had a significant impact on trading in VIX futures and options.

129. Simply put, the CBOE Defendants knew or should have known that their own bylaws and regulations were being violated. By failing to take sufficient actions, they acted in bad faith and violated the CEA causing injury to Plaintiff and the Class.

ENFORCEMENT ACTIONS DEMONSTRATE THE VIX’S VULNERABILITY TO MANIPULATION

130. The VIX’s vulnerability to manipulation is further confirmed by the relatively few times regulators have caught bad actors. While these actions lend credence to the VIX’s vulnerability, their relative paucity—in the face of the economic evidence above showing systemic problems with the VIX—demonstrates that these isolated fines are just the tip of the iceberg.

¹⁹ Saqib Iqbal Ahmed & John McCrank, Whistleblower alleges manipulation of Cboe volatility index, Reuters (Feb. 13, 2018), <https://www.reuters.com/article/us-usa-stocks-volatility-manipulation/whistleblower-alleges-manipulation-of-cboe-volatility-index-idUSKBN1FX0ES>.

²⁰ *Id.*

131. Indeed, these enforcement actions missed the forest for the trees, with the CBOE choosing to focus on small instances of manipulation with many of the settlements not even exceeding \$100,000. Meanwhile, rampant VIX manipulation that affected billions of dollars in transactions was ignored.

A. Igor B. Oystacher & 3Red Trading LLC

132. On October 19, 2015, the CFTC filed a complaint against 3Red Trading and its principal Mr. Oystacher, seeking injunctive relief, disgorgement, and civil penalties for various violations of the CEA. *See CFTC v. Oystacher*, No. 15-cv-9196 (N.D. Ill.).

133. The CFTC alleged that Mr. Oystacher and 3Red Trading engaged in spoofing on multiple futures contracts, including the March 2013 and April 2013 VIX futures contracts. On December 20, 2016, the CFTC and the Defendants entered a consent decree, which permanently enjoined them from engaging in spoofing activities, imposed monitoring requirements, and required the payment of a \$2,500,000 civil monetary penalty.

B. Ronin Capital, LLC

134. On August 10, 2015, the CBOE’s Business Conduct Committee (“BCC”) fined Ronin Capital \$175,000 and ordered disgorgement of \$128,000 for violating CBOE rules prohibiting strategy orders after 8:15 a.m. Central Time and having an improper effect on the VIX settlement price.

C. Morgan Stanley & Company LLC

135. On September 24, 2012, the CBOE’s BCC fined Morgan Stanley \$20,000 for violating CBOE rules prohibiting strategy orders, relating to VIX futures, after 8:15 a.m. Central Time.

D. John M. Tobias III

136. On August 22, 2011, the CBOE's BCC fined John Tobias of Cassandra Trading Group, LLC, \$20,000 for violating various CBOE rules, including conduct concerning VIX options.

E. Sparta Group of Chicago, L.P. and Andrew W. Smyth Jr.

137. On April 12, 2012, the CBOE's BCC fined Sparta Group and a former trader Andrew Smyth, \$50,000 and suspended Mr. Smyth's trading permissions for two weeks for violating various CBOE rules, including conduct concerning VIX options.

F. Ivan Tchorbadjiyski

138. On August 17, 2010, the CBOE's BCC fined Ivan Tchorbadjiyski \$25,000 and suspended his trading permissions for two weeks for violating various CBOE rules, including conduct concerning VIX options.

G. Steven V. Berman

139. On August 13, 2010, the CBOE's BCC fined Steven Berman \$50,000 and suspended his trading permissions for three weeks for violating various CBOE rules, including conduct concerning VIX options.

H. Other Enforcement Actions Concerning Volatility Indices: DRW Securities, LLC

140. On December 19 and 21, 2017, the CBOE's BCC fined DRW Securities \$1.25 million in two enforcement actions for placing improper strategy orders in connection with the SOQs for volatility futures contracts: CBOE Emerging Markets ETF Volatility Index Futures contract (VXEM), CBOE Brazil ETF Volatility Index Futures contract (VXEW) and CBOE Crude Oil ETF Volatility Index Futures contract (OV).

141. Even viewed collectively, however, these minuscule penalties (totaling just \$4.2 million over the course of seven years) are entirely eclipsed by the approximate \$1.8 **billion** in losses to investors as a result of the rampant VIX manipulation.

CLASS ALLEGATIONS

142. Plaintiff brings this action as a class action, under Fed. R. Civ. P. 23(a) and (b)(3), on behalf of herself and all similarly situated:

All persons or entities who transacted in VIX derivatives (the “Class”), from January 1, 2010 through the present (the “Class Period”).

143. The following persons and entities are excluded from the above-described proposed Class:

- (a) Defendants and their counsel, officers, directors, management, employees, subsidiaries, or affiliates;
- (b) All Class Members bound to arbitrate claims arising from VIX trading under Chicago Board Options Exchange Rule 18.1 and Chicago Futures Exchange Rule 801;
- (c) All Counsel of Record; and
- (d) The Court, Court personnel, and any member of their immediate families.

144. The Class Members are so numerous that joinder is impracticable. Plaintiff believes that there are thousands of Class Members.

145. Plaintiff’s claims are typical of the claims of the members of the Class. Plaintiff and Class Members were damaged by the same wrongful conduct by Defendants in that they purchased or sold derivatives linked to the VIX at artificial prices as a result of Defendants’ wrongful conduct.

146. Plaintiff will fairly and adequately protect and represent the interests of the Class.

Plaintiff's interests are coincident with, and not antagonistic to, those of the Class Members.

147. Plaintiff is represented by counsel with experience in the prosecution of class action commodities litigation, and with experience in class action commodities litigation involving the financial markets and related financial services.

148. Questions of law and fact common to the Class Members predominate over questions that may affect only individual Class Members because Defendants have acted on grounds generally applicable to the entire Class, making damages with respect to the Class as a whole appropriate.

149. Questions of law and fact common to all class members include:

- (a) whether the John Doe Defendants manipulated the VIX;
- (b) whether the John Doe Defendants had the ability to influence the VIX;
- (c) whether the John Doe Defendants intended to influence prices of VIX derivatives, including VIX futures and options contracts traded on the CBOE;
- (d) whether the John Doe Defendants intended to manipulate prices of VIX derivatives, including VIX futures and options contracts traded on the CBOE;
- (e) whether the John Doe Defendants' conduct caused the VIX to be artificial;
- (f) whether the John Doe Defendants' conduct caused the prices and settlement values of VIX derivatives, including futures and options, to be artificial;

- (g) whether the CBOE and CFE acted in bad faith by failing to enforce bylaws, rules and/or regulations;
- (h) whether the CBOE and CFE knew or should have known that the VIX was being manipulated;
- (i) whether the CBOE and CFE were complicit with the ongoing manipulation of the VIX;
- (j) whether, and to what extent, all Defendants' conduct caused injury to the Plaintiff and Class Members' VIX derivatives positions;
- (k) the quantum of damages sustained by Plaintiff and Class Members in the aggregate; and
- (l) whether the John Doe Defendants willfully engaged in manipulation such that Plaintiff and Class Members are entitled to punitive damages.

150. Class action treatment is a superior method for the fair and efficient adjudication of the controversy. Such treatment will permit a large number of similarly situated, geographically dispersed persons or entities to prosecute their common claims in a single forum simultaneously, efficiently, and without the unnecessary duplication of evidence, effort, or expense that numerous individual actions would engender. The benefits of proceeding through the class mechanism, including providing injured persons or entities a method for obtaining redress on claims that could not practicably be pursued individually, substantially outweighs any potential difficulties in management of this class action.

151. Plaintiff knows of no special difficulty to be encountered in the maintenance of this action that would preclude its maintenance as a class action.

**DEFENDANTS' CONCEALMENT OF
MISCONDUCT TOLLS THE STATUTE OF LIMITATIONS**

152. John Doe Defendants' ongoing attempts to manipulate the VIX and VIX-related derivatives, were hidden from the general public.

153. Neither Plaintiff nor the Class knew of John Doe Defendants' unlawful and self-concealing manipulative acts and could not have discovered them by the exercise of reasonable due diligence, if at all, even with the publication of the Griffin Study. Plaintiff and the Class still do not know who the wrongdoers are given that trading on the CBOE is anonymous. As such, even prior enforcement proceedings by the CFTC or CBOE do not provide Plaintiff or the Class notice as to who exactly was responsible for all manipulative conduct during the Class Period. Further, it was only after the publication of the Griffin Study that Plaintiff and the Class formed a basis for calculating damages.

154. Following Professor Griffin's article into potential VIX manipulation, Plaintiff undertook investigation into possible manipulation of the VIX, retained counsel, and retained economic consulting experts to undertake sophisticated economic investigation of the VIX and whether they were subject to manipulation by Defendants.

155. Reasonable due diligence could not have uncovered John Doe Defendants' manipulative conspiracy because: (i) the VIX was held out as being set impartially based on market factors; (ii) John Doe Defendants' trading positions and trading strategies are not public information; (iii) the highly specialized and esoteric nature of the different aspects of the VIX and VIX derivatives market make it extraordinarily difficult for an ordinary person to assess improprieties; and (iv) John Doe Defendants never disclosed that they were manipulating the VIX and VIX derivatives.

156. John Doe Defendants also took active steps to conceal evidence of their misconduct from Plaintiff, the Class, and the public including, among other things: (i) maintaining the secrecy of their trading positions in VIX derivatives; (ii) avoiding any discussion in public fora of the VIX and/or manipulation of the VIX; (iii) refusing to comment on manipulation reported by the press; and (iv) initiating sham trades they never intended to execute in order to influence artificially the price of VIX derivatives.

157. Similarly, the CBOE and CFE took steps to conceal the manipulation of the VIX by failing to enforce bylaws, rules and/or regulations that would have prevented manipulation and disclosed the problems to investors and the public.

158. In addition, John Doe Defendants and their co-conspirators also failed to have the proper internal controls in place to detect internal misconduct concerning the VIX or trading of VIX derivatives, including VIX futures and options. Such internal failures made it all the more difficult for Plaintiff, the Class, and the public to become aware of John Doe Defendants' misconduct.

159. As a result of John Doe Defendants' affirmative steps to conceal their improper conduct; their willful decision not to put in place proper controls to detect improper conduct; and the resulting lack of public information about material aspects of the John Doe Defendants' manipulation, the statute of limitations was tolled for Plaintiff's and the Class's claims.

CLAIMS FOR RELIEF

FIRST CLAIM FOR RELIEF

Manipulation in Violation of the Commodity Exchange Act, 7 U.S.C. §1, et seq. (Against John Doe Defendants)

160. Plaintiff incorporates by reference the above allegations.

161. **Ability to Influence Prices.** Throughout the Class Period, John Doe Defendants possessed the ability to influence the VIX market because, on information and belief, they acted as market makers for SPX options and VIX derivatives, including VIX futures and options. As a result of their market maker status, they were able to trade at sufficient volumes to make manipulation of the VIX both possible and profitable.

162. **Causation and Artificial Price.** When a factor that affects a price is artificial or illegitimate, then the resulting futures or options contract prices are necessarily artificial. Here, John Doe Defendants manipulated the VIX underlying VIX derivatives contracts traded on the CBOE. Thus, John Doe Defendants' manipulation of the VIX directly and proximately caused artificial pricing in these derivative instruments.

163. **Intent.** John Doe Defendants specifically and purposefully intended to manipulate the VIX through the uneconomic trading of SPX options, with the understanding that any costs borne in transacting in these options would be recouped on profits made in related VIX derivatives. Each Doe Defendant specifically intended to manipulate the VIX to obtain ill-gotten trading profits from VIX derivatives contracts held by it. As alleged in this Complaint, VIX futures and options contracts are settled based on the VIX. Thus, as a direct result of John Doe Defendants' unlawful conduct, the prices of VIX futures and options were manipulated to artificial levels during the Class Period.

164. Each Doe Defendant through its acts alleged in this Complaint, specifically intended to and did cause unlawful and artificial prices of VIX derivative contracts in violation of the CEA, 7 U.S.C. § 1, *et seq.*

165. The John Doe Defendants' manipulative conduct and trading activity alleged in this Complaint constituted both a manipulation of the prices of S&P 500 index options and of the VIX underlying VIX derivative contracts in violation of Section 4b(a), 4c(a), 9(a) and 22(a) of the CEA, 7 U.S.C. §§ 6b(a), 6c(a), 13(a)(2), and 25(a). As a direct result of John Doe Defendants' unlawful conduct, Plaintiff and members of the Class have suffered actual damages and injury in fact due to artificial prices for VIX derivatives to which they would not have been subject but for the unlawful conduct of the John Doe Defendants as alleged in this Complaint. Plaintiff and members of the Class were further legally injured and suffered injury in fact in that they transacted in VIX derivatives in an artificial and manipulated market operating under the artificial prices caused by the John Doe Defendants.

166. Plaintiff and members of the Class who purchased or sold VIX derivatives during the Class Period were injured and are each entitled to their actual damages for the violations of the CEA alleged in this Complaint.

167. Further, John Doe Defendants willfully violated the anti-manipulation provisions of the CEA, entitling Plaintiff and the Class to an award of punitive damages.

SECOND CLAIM FOR RELIEF
Registered Entity Liability under the Commodity Exchange Act, 7 U.S.C. § 25(b)
(Against CBOE Defendants)

168. Plaintiff incorporates by reference the above allegations.

169. The CBOE Defendants failed to enforce bylaws, rules and regulations that were required by law, including but not limited to CBOE Rules 4.1 (Just and Equitable Principles of Trade), 4.2 (Adherence to Law), and 4.7 (Manipulation), and CFE Rules 601 (Fraudulent Acts),

602 (Fictitious Transactions), 603 (Market Manipulation), and 604 (Adherence to Law). These entities, as designated contract markets, were required to do so under the CEA, 7 U.S.C. § 7(d).

170. The CBOE Defendants acted in bad faith by failing to enforce such bylaws, rules, and regulations because they were willfully blind to the fact that the VIX has been repeatedly manipulated for years, and that such manipulation has had a significant impact on VIX derivatives. The CBOE Defendants should have known that those bylaws, rules, and regulations were being violated, but they instead took no action despite having sufficient information to detect manipulation. Both entities failed to enforce their rules vigorously because they stood to lose substantial trading fees they received from the high volumes of index options and futures contacts trading, which include VIX derivatives, such as VIX futures and options.

171. The CBOE Defendants have repeatedly rejected claims that the VIX has been subject to manipulation, even though they have had full access to all of the trading data that supports a clear finding of market manipulation.

172. To this day, the CBOE Defendants have maintained that there is no manipulation of the VIX, despite the overwhelming evidence suggesting otherwise.

173. Collectively, these actions support a finding of bad faith because they were both complicit in the market manipulation.

174. Plaintiff was actually damaged as a result of the CBOE Defendants' repeated bad faith failure to enforce bylaws, rules and regulations.

THIRD CLAIM FOR RELIEF
Manipulation in Violation of the Commodity Exchange Act,
Including CFTC Rule 180.2
(Against John Doe Defendants)

175. Plaintiff incorporates by reference the above allegations.

176. Under CFTC Rule 180.1, it is “unlawful for any person, directly or indirectly, in connection with any swap, or contract of sale of any commodity interstate commerce, or contract for future delivery on or subject to the rules of any registered entity, to intentionally or recklessly . . . use or employ, or attempt to use or employ, any manipulative device, scheme, or artifice to defraud.”

177. Each Doe Defendant intentionally and recklessly employed one or more of the following manipulative devices in furtherance of its manipulation of the VIX and VIX futures and options.

- (a) Engaging in uneconomical bidding, offering, or trading activity in SPX options during the VIX settlement window; and
- (b) Engaging in spoofing for purposes of inducing other market participants to perceive greater market depth than actually existed at prevailing prices.

178. As a result of each John Doe Defendant’s use of the above manipulative devices, John Doe Defendants caused prices of Plaintiff’s and the Class’s VIX derivatives to be artificial. As a result of these price artificialities, Plaintiff and the Class suffered losses on their VIX derivative contracts.

FOURTH CLAIM FOR RELIEF
Principal-Agent Liability in Violation of the Commodity Exchange Act, 7 U.S.C. § 1, et seq.
(Against John Doe Defendants)

179. Plaintiff incorporates by reference the above allegations.

180. Each Doe Defendant is liable under Section 2(a)(1) of the CEA, 7 U.S.C. §2(a)(1), for the manipulative acts of its agents, representatives and/or other persons acting for it in the scope of their employment.

181. Plaintiff and members of the Class are each entitled to actual damages sustained in VIX derivatives for the violations of the CEA alleged in this Complaint.

FIFTH CLAIM FOR RELIEF
Aiding and Abetting Manipulation in Violation of the Commodity Exchange Act 7 U.S.C. §
1, et seq.
(Against John Doe Defendants)

182. Plaintiff incorporates by reference the above allegations.

183. John Doe Defendants knowingly aided, abetted, counseled, induced and/or procured the violations of the CEA by other John Doe Defendants as alleged in this Complaint. John Doe Defendants further coordinated their trading and market making activity around this market-sensitive information for the purposes of manipulating the VIX and the pricing of VIX futures and options.

184. Each Doe Defendant did so knowing of other John Doe Defendants' manipulation of the VIX and VIX futures and options. These actions demonstrate that Defendants substantially and willfully intended to assist these manipulations to cause the prices of VIX derivatives to be artificial during the Class Period, in violation of Section 22(a)(1) of the CEA, 7 U.S.C. §25(a)(1).

185. Under Section 13(a) of the CEA, 7 U.S.C. §13c(a), John Doe Defendants are liable for willfully intending to assist the manipulation.

186. Other persons willfully intended to assist these manipulations to cause VIX derivatives to reach artificial levels during the Class Period, in violation of Section 22(a)(1) of the CEA, 7 U.S.C. §25(a)(1). They are the agents as alleged in this Complaint.

187. Plaintiff and members of the Class are each entitled to actual damages sustained for the violations of the CEA alleged in this Complaint.

REQUEST FOR RELIEF

WHEREFORE, Plaintiff requests the following relief:

- A. That the Court determine that this action may be maintained as a class action under Rule 23(a) and (b)(3) of the Federal Rules of Civil Procedure; declare Plaintiff as the representative of the Class; declare Plaintiff's counsel as counsel for the Class; and direct that notice of this action, as provided by Rule 23(c)(2) of the Federal Rules of Civil Procedure, be given to the Class;
- B. That the Court enter an order declaring that Defendants' actions, as set forth in this Complaint, violate the law;
- C. That the Court award Plaintiff and the Class damages against Defendants for their violations of the Commodity Exchange Act;
- D. That the Court award Plaintiff and the Class punitive damages for Defendants' willful violations of the Commodity Exchange Act;
- E. That the Court award Plaintiff and the Class pre- and post-judgment interest;
- F. That the Court award Plaintiff her costs of suit, including reasonable attorneys' fees and expenses; and
- G. That the Court award such other equitable and further relief as the Court may deem just and proper.

DEMAND FOR JURY TRIAL

Plaintiff demands a trial by jury, pursuant to Rule 38(b) of the Federal Rules of Civil Procedure, of all issues so triable.

Dated: April 5, 2018

ZILIAK LAW, LLC

/s/ Zachary J. Ziliak

Zachary J. Ziliak
141 W. Jackson Blvd.
Suite 4048
Chicago, Illinois 60604
Tel: (312) 462-3350
zachary@ziliak.com

LABATON SUCHAROW LLP

Gregory S. Asciola (*pro hac vice pending*)
Jay L. Himes (*pro hac vice pending*)
Christopher J. McDonald (*pro hac vice pending*)
Matthew J. Perez (*pro hac vice pending*)
Brian Morrison (*pro hac vice pending*)
140 Broadway
New York, New York 10005
Tel: (212) 907-0700
Fax: (212) 818-0477
gasciolla@labaton.com
jhimes@labaton.com
cmcdonald@labaton.com
mperez@labaton.com
bmorrison@labaton.com

DIMOND KAPLAN & ROTHSTEIN, P.A.

Jeffrey B. Kaplan (*pro hac vice pending*)
Brian Levin (*pro hac vice pending*)
Grand Bay Plaza
2665 S. Bayshore Drive
Miami, Florida 33133
Tel: (305) 600-2528
jkaplan@dkrpa.com
blevin@dkrpa.com

Counsel for Plaintiff and the Proposed Class